

US 97 Parkway Plan Phase 1

Summary of Existing Plans & Agreements

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FINAL

Prepared for:



Prepared by:



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1 INTRODUCTION

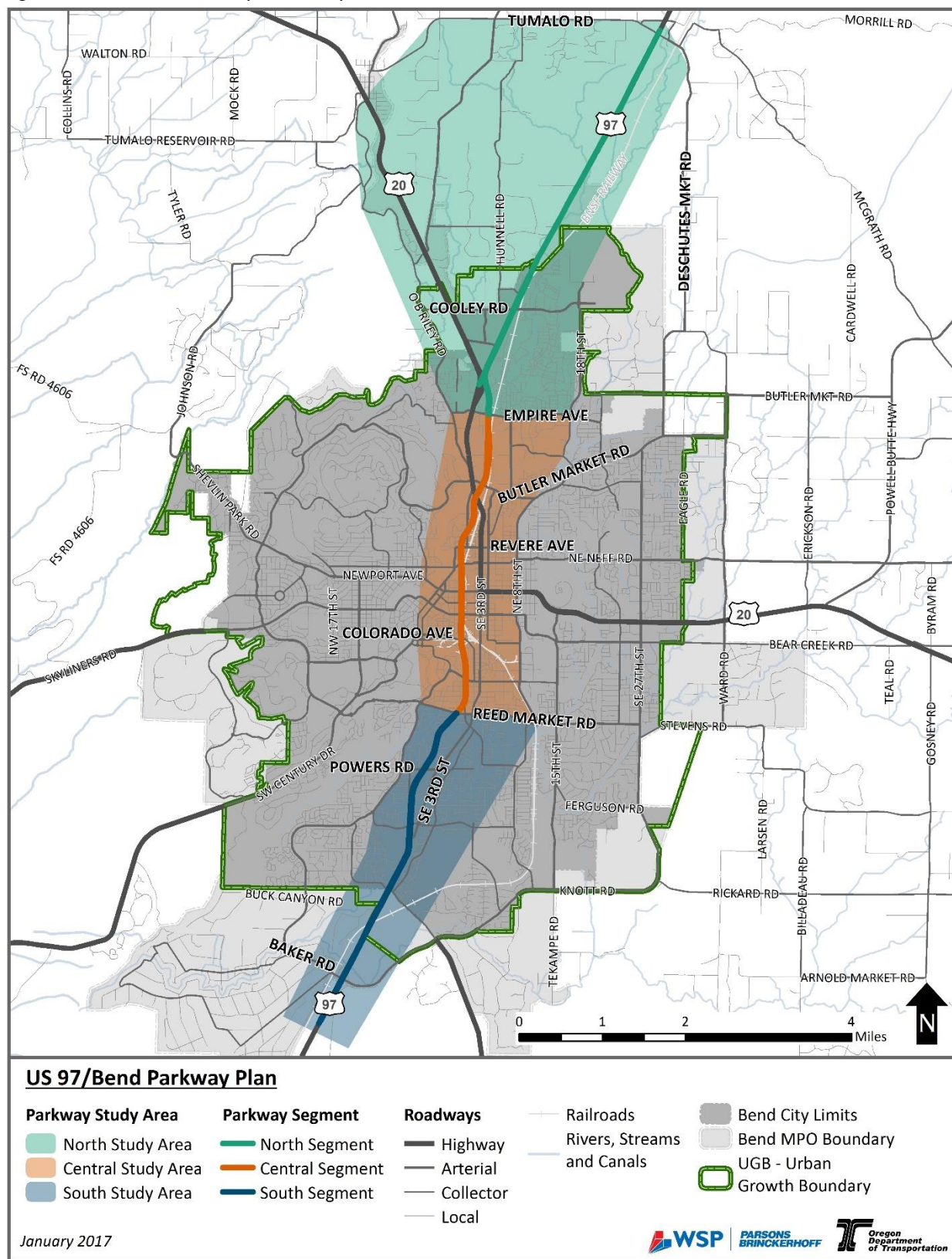
Ultimately, the US 97 Parkway Plan (Parkway Plan) will identify geometric, operational, management and safety strategies to be implemented on the Parkway to improve its performance into the future. The purpose of Phase 1 of the plan is to provide a summary of the existing conditions with influence in the study area.

This report provides a summary of key plans, studies, and management agreements that influence the US 97 Parkway Plan study area. Some relate to the entire corridor and others are specific to an interchange or segment of the Parkway. As such, this report is divided into a several chapters. Chapter 2 addresses the overarching documents that influence decisions at the state and regional levels. Chapters 3, 4 and 5 present specific plans and studies that were developed to address specific issues along the study area.

The study area is defined as US 97 between mile point 130.31 and 144.06 and is shown on Figure 1. The study area has been broken into three geographically oriented areas, defined as:

- **North Area:** The northern boundary is the Deschutes Market Interchange and the southern boundary is the Empire Avenue Interchange (MP 130.31 to 135.51). The eastern boundary is 18th Street/Purcell and the western boundary is O.B. Riley Road.
- **Central Area:** The northern boundary is the Empire Avenue Interchange and the southern boundary is the Reed Market Interchange (MP 135.51 to 139.14). The eastern boundary is 8th Street/9th Street and the western boundary is Wall Street.
- **South Area:** The northern boundary is the Reed Market Interchange and the southern boundary is the Bend MPO boundary, including the Baker Road Interchange (MP 139.14 to 144.06). The eastern boundary is 3rd Street and the western boundary is Brookwood Blvd.

Figure 1. US 97/Bend Parkway Plan Study Area



2 STUDY AREA AND OVERARCHING PLANS

There are a number of statewide and regional plans that influence the geometric, operational, management, and safety strategies implemented and constructed in the corridor.

2.1 OREGON STATEWIDE RULES AND PLANS

2.1.1 Transportation Planning Rule, as Amended

Oregon's Transportation Planning Rule (TPR) was enacted to support Oregon's Statewide Planning Goal 12, Transportation, and is implemented through Oregon Administrative Rule (OAR) 660-12. Goal 12 seeks to "promote the development of safe, convenient and economic transportation systems" designed to reduce reliance on the automobile. In 2012, Section 0060 of the TPR was revised to better address transportation requirements in urban environments to promote economic development and compact urban development as described in other Statewide Planning Goals.

The TPR requires the MPOs to adopt and implement transportation demand strategies. Evaluation is required over time to demonstrate progress towards increasing transportation choices and reducing automobile reliance. The basic requirement is to have a demand management plan and a parking plan. The two plans should do the following:

- Show achievement of a 10 percent reduction in the number of parking spaces per capita over a 20-year period.
- Show achievement of a 10 percent reduction in vehicle miles traveled (VMT) per capita over a 20-year period.
- Show achievement of an additional five percent reduction in VMT within 30 years of adoption of the Transportation System Plan (TSP).
- Establish minimum and maximum parking regulations.
- Be consistent with demand management programs, transit-oriented developments, and planned transit service.

The TPR also allows jurisdictions to choose alternative standards instead of the VMT reduction standard, the Land Conservation and Development Commission (LCDC) can authorize alternative standards to demonstrate progress towards achieving reduced reliance on the automobile.

Specific performance standards to meet the TPR for the Parkway Plan are identified in the Oregon Highway Plan, Policy 1F – Highway Mobility Policy, as further discussed below.

2.1.2 Oregon Transportation Plan, 2006

The Oregon Transportation Plan (OTP) is made up of nine modal or element plans that facilitate an integrated and interconnected transportation system. The 2006 Oregon Transportation Plan is the overarching policy document among a series of plans (summarized in sections below) that together form the state transportation system plan (TSP). The OTP recognizes that recent and anticipated population growth in the Bend MPO, along with all of Oregon's urban areas, will continue to have an impact on multimodal travel within and through the city and nearby communities. The OTP establishes a set of seven goals and supporting policy to guide studies and investments on the statewide multimodal

transportation network. The plan summaries below highlight relevant information in the statewide mode-specific plans.

2.1.2.1 Oregon Highway Plan, 1999

The 1999 Oregon Highway Plan (OHP) defines policies and investment strategies for the state highway system. The OHP was originally established with five goals: System Definition, System Management, Access Management, Travel Alternatives, and Environmental and Scenic Resources. In 2012 the OHP was updated with several significant changes. The Highway Mobility Policy (Policy 1F) was rewritten to enhance focus on multimodal and community objectives. This directly relates to the Transportation Planning Rule 2012 amendments, discussed above, which focused on urban issues. Additional OHP revisions were made to the Access Management goal and a sixth goal was added: Tolling and Congestion Pricing.

US 97/Parkway in the study area has multiple classifications that dictate policies and requirements that apply to the roadway. Many of the classifications also determine the funding sources that are available to projects on the highway.

- **National Highway System (MP 130.31 to 144.06):** a system of Statewide and Interstate Highways and intermodal connectors meeting federal criteria, designated by Congress in the National Highway System Designation Act of 1995. Oregon has 470 miles of routes on the National Highway System.
- **National Network, Federally Designated Truck Route (MP 130.31 to 144.06)**
- **Reduction Review Route (MP 130.31 to 144.06):** Reduction Review Routes (RRR) are routes that have been identified as state highways that must meet specific horizontal or vertical clearance requirements. A proposed action on a designated RRR is subject to ORS 366.215 and require a review under OAR 731-012-0030, Division 12. If it is found that a project will not meet the clearance requirements, a formal review shall commence to determine if the proposed action is to be allowed (for safety or access) or will need to be revised to meet the clearance requirements.
- **Expressway (MP 130.31 to 144.06):** Expressways are defined as “complete routes or segments of existing...highways that provide for safe and efficient high speed and high volume traffic movements. Their primary function is to provide for interurban travel and connections to ports and major recreation areas with minimal interruptions. A secondary function is to provide for long distance intra-urban travel in metropolitan areas. In urban areas, speeds are moderate to high...Usually there are no pedestrian facilities, and bikeways may be separated from the roadway” (p. 38). Private access is discouraged, public road access is highly controlled, and parking is prohibited on expressways.
- **Bypass (MP 134.67 to 141.91):** Bypasses are highways designed to maintain or increase mobility for through traffic. Generally they relocate the highway alignment around a downtown, an urban or metropolitan area or an existing highway to provide an alternative route for through traffic using that highway.

Table 2-1. Access Management Intersection Spacing Standards (AADT of More than 5,000 Vehicles)

Posted Speed	Urban Expressway
55 mph or higher	2,640 ft. (MP 142.52 to 142.87)
45 mph	2,640 ft. (MP 134.76 to 142.52)

Source: 1999 Oregon Highway Plan, Including amendments November 1999 through May 2015; Table 14.

Highway Mobility Policy 1F

The Highway Mobility Policy (interchangeably called Policy 1F) establishes state highway mobility targets that implement the objectives of the OTP and other OHP policies. Policy 1F establishes mobility objectives for the highway system as congestion targets to meet the TPR as identified with volume to capacity (v/c) ratios in Table 2-2. However, achieving v/c targets will not necessarily be the determinant of the transportation solution(s). The policy also recognizes and emphasizes opportunities for developing alternative mobility targets (including measures that are not v/c-based) that provide a more effective tool to identify transportation needs and solutions and better balance state and local community needs and objectives. In particular, the policy recognizes the importance of considering the performance of other modes of travel. While the policy does not prescribe mobility targets for other modes of travel, it does allow and encourage ODOT and local jurisdictions to consider mobility broadly – through multimodal measures or within the context of regional or local land use objectives.

Still, the policy reflects the expectation that highways, and the Parkway, maintain a level of mobility to safely and efficiently support statewide economic development while balancing available financial resources. The policy states: “In order to better support state and local economic activity, targets for Freight Routes are set to provide for less congestion than would be acceptable for other state highways. Interstate Highways and Expressways are incompatible with slower traffic and higher level of vehicular congestion...For Interstate and Expressway facilities it will be important to manage congestion to support regional and state economic development goals.” If the Parkway Plan recommends a less stringent volume to capacity ratio, the Oregon Transportation Commission would need to be consulted and formally approve the request.

Table 2-2. Volume to Capacity Ratio Targets for Peak Hour Operating Conditions

Highway Category	Inside Urban Growth Boundary, MPO	Outside Urban Growth Boundary
Statewide Expressways	0.85 (MP 134.76 to 141.83)	0.70
Freight Route on a Statewide Highway	0.85 (MP 141.83 to 142.87)	0.70 (MP 130.31 to 134.76, MP 142.87 to 144.06)

Source: 1999 Oregon Highway Plan, Including amendments November 1999 through May 2015; page 84.

2.1.2.2 Oregon Freight Plan, Rail Plan, and Aviation Plan

The 2011 Oregon Freight Plan (OFP) identifies US 97 as the Central Oregon corridor, a strategic freight-dependent corridor. As a parallel route to I-5, US 97 provides redundancy to Oregon’s entire freight network. It carries relatively high-value products in the Agriculture, Forestry and Fishing and the Food Manufacturing industry groups. Throughout the Parkway Plan study area, BNSF Railway (BNSF) runs parallel to US 97 and provides shared use with the Union Pacific (UP) Railroad. Also known as the Oregon Trunk Line, BNSF is the major north-south rail corridor in Oregon connecting to California and Washington (2017 Oregon Rail Plan). Similarly, a pipeline runs north-south through the state adjacent to

US 97. The Bend Municipal Airport is located east of the study area at NE Butler Market Road and Powell Butte Road (2007 Oregon Aviation Plan).

2.1.2.3 Oregon Bicycle and Pedestrian Plan, Public Transportation Plan & Transportation Options Plan

The 2015 Oregon Bicycle and Pedestrian Plan (OBPP) contains the state's policy and strategies for biking and walking modes in a similar level to the other OTP modal elements. It sets forth the statewide vision and nine goal areas, including safety, accessibility, and equity. The Parkway has striped bicycle lanes or allows bikes on the Parkway shoulder throughout the study area. There are sidewalks along some segments of the Parkway in the study area. The OBPP policies and strategies will be particularly important at key at-grade intersections with the east-west streets of Cooley Road and Robal Road.

The state is currently in the process of updating the Oregon Public Transportation Plan (OPTP). The OPTP will focus on policies and strategies that cover transportation services provided by or funded by public agencies, like fixed-route bus, demand response (door-to-door) services, streetcar, and light rail. The plan will also look at interactions between public services and existing and emerging private services, like intercity bus, ridesharing, and carsharing systems. As a statewide plan, it will provide a high-level foundation that will guide public transportation decisions and investment throughout the state.

The 2015 Oregon Transportation Options Plan (OTOP) provides policy guidance for state and local partners to enhance and expand transportation access for all Oregonians while ensuring that transportation investments are efficient and support broader community goals such as growing the economy and improving personal and environmental health. Options included in the OTOP include programs and investments that facilitate the use of biking, walking, taking transit, sharing rides, and telecommuting. One example of a transportation option program is the Bend Commute Options Rewards Program that works with employers to expand the number of employees walking, biking, taking transit, and sharing rides. The plan found that in Bend, nearly 25 percent of those commuting to work in 2012 did not drive alone; they chose to either carpool, bicycle, walk, take transit or a taxi, or to work from home (p. 32).

2.1.2.4 Oregon Transportation Safety Action Plan, 2016

The 2016 Oregon Transportation Safety Action Plan (TSAP) sets forth a vision for "no deaths or life-changing injuries on Oregon's transportation system by 2035." To achieve this, the TSAP provides long term goals, policies and strategies, and near-term actions. This plan emphasizes that infrastructure investments include safety treatments and consider the most vulnerable roadway users, such as pedestrians, bicyclists and motorcyclists, during design.

2.1.3 ODOT 2015-2018 Statewide Transportation Improvement Program

The Statewide Transportation Improvement Program (STIP) details the full list of funded projects on ODOT's facilities. The list below are the STIP projects (amended as of Monday, January 16, 2017) in the study area (between mile posts 130.31 and 144.06).

Table 2-3. 2015-2018 STIP Projects in the Study Area

Name (STIP Key)	Mile Points	Description	Status	Total STIP Amount
US97: Romaine Village Way - Lava Butte (17807)	141.86 to 147.50	Widen median and install concrete Median barrier.	Construction Phase Completed 2016	\$8,061,000
US97/Murphy Rd: Brookwood-Parrell (Bend) Phase 2 (18270)	141.00 to 142.30	Extension and realignment of Murphy Road.	Construction Phase Completed 2015	\$7,204,000
US97 (Bend Parkway) Incident Response Cameras (18690)	138.08 to 139.98	Install cameras.	Combined with another Project	\$75,000
US97: Bend To Spring Creek Hill VSL (19260)	143.00 to 244.00	Install weather responsive variable Speed limit system.	Final Plans Scheduled to Begin	\$300,000
US97 @ Powers Rd (19450)	139.70 to 140.30	Develop Final Plans for bike-ped crossing.	Final Plans Scheduled to Begin	\$219,300
US97: Redmond to Bend (20357)	124.40 to 133.39	Speed feedback signs, pavement markings, lighting, signing and striping enhancements.	Land Purchase	\$613,000
US97 Bend North Corridor Project (14020)	US 20: 17.49 to 19.03	Corridor Planning & Development	Land Purchase; Combined with 20391	\$12,484,000
US20 @ Empire Avenue (19572)	18.80 to 18.80	Signal system upgrades & improvements.	Combined with 20391	\$75,000
US20: Empire - Greenwood (3rd St, Bend) (20391)	18.80 to 20.99	Design shelf plans for pavement preservation, ADA upgrades, sidewalks, bike lanes, pedestrian crossing, sign and signal upgrades.	Final Plans Scheduled to Begin	\$2,646,011

2.1.4 The Oregon Resilience Plan, 2013

The Oregon Resilience Plan presents the steps needed to bring Oregon's roadway infrastructure up to performance levels to withstand an inevitable natural disaster of a Cascadia earthquake and tsunami. The intent is to prepare a plan for enhancing our infrastructure so that when the disaster occurs, our economy and communities will recover quickly.

The Plan found that our state is far from resilient from the impacts of an earthquake and tsunami today. A key component of the Resilience Plan is to seismically upgrade lifeline transportation routes into and out of major business centers statewide by 2030. The report finds that US 97 has the ability to provide a back-up route if I-5 is not operational or is severely restricted. US 97 will be a critical facility for ongoing interstate commerce and for staging response and recovery efforts.

The Plan identifies US 97 from I-84 to the California border as a part of the Tier 1, Phase 1 system (also referred to as the backbone system), which is a designated network of highway routes that allows access to all vulnerable regions, major population centers, and areas considered vital for rescue and recovery operations. This backbone system was also perceived to be the lowest retrofit cost. In addition to the entire length of US 97, the other portions of the statewide backbone system include:

- I-5, from I-84 (Portland) to OR 58
- I-84, from I-5 (Portland) to U.S. 97
- OR 58, from I-5 to U.S. 97

The report indicates that the movement of goods and people is likeliest along US 97 because of the low vulnerability of the highway and access to the BNSF railroad and the Redmond airport. The Plan presents lists of short- and long-term recommendations.

2.1.5 Oregon State Highway Performance Data and Metrics Related to Freight, 2013

This report was prepared in 2013 to identify freight bottleneck locations in Oregon. The US 97 corridor was studied from the Oregon/Washington State Boarder to the Oregon/California border. Of all 19 corridors studies statewide, the US 97 corridor:

- Ranks in the top three in terms of total industry flows by value for Agriculture, Forestry and Fishing (12.37%) and Food Manufacturing (13.74%).
- Ranks in the top three corridors for total industry by weight for five industries: Agriculture, Forestry and Fisheries, Food Manufacturing, Machinery and Metals, Retail Trade and Services/Other.
- Ranks in the top three for two specific commodities by value - Food and Kindred Products and Other/Miscellaneous.
- Ranks in the top three for Food and Kindred Products by weight.

Locations with the most delay are generally located around Bend and north. For the corridor overall, about 70 percent of delay is due to congestion and about 8 percent is due to incidents. Roadway curvature and grade account for about 22 percent of total delay (outside of the study area).

2.1.6 ODOT Pinch-Point Reports, 2015

ODOT's Freight Planning Unit conducted the Highway Over-dimension Load Pinch Points (HOLPP) study in late 2015. In total, the study identified 12 pinch points on US 97, five of which are recommended as high priority, with the following characteristics:

General Information	Pinch Point Type* Location & Description	Analysis and Recommendation
County: Deschutes MP 134.93 Travel Direction: SB Approx. # of Over-dimension loads/month:142	Pinch Point type: VC This structure is the NB US20/ US97 Business connection to US20 west in the north part of Bend. This is a High Route and VC should be 17'-4" but is 15'-10". This roadway (Exit 135A) takes SB traffic to US20/US97 Business and US20 EB.	Pinch point appears to be a significant constraint. Impact of Removing Pinch Point: This RRR segment would probably be able to accommodate taller loads. <i>Recommendation: High Priority Pinch Point.</i>

* Pinch Point Types: WL = Wide & Long Loads, VC = Vertical Clearance; HL = Heavy Loads; OD = Over-dimension; MP = milepost; NB = northbound; SB = southbound; EB = eastbound; WB; westbound;

2.1.7 Transportation Reinvestment Innovation and Planning for 97 Partnership

The Transportation Reinvestment Innovation and Planning for 97 Partnership (TRIP97) plan was created to identify and prioritize strategic projects on US 97 that promote the economic condition of Central Oregon and to maximize investment dollars for the benefit of the region. TRIP97 is a collaborative

Partnership between: ODOT, Deschutes and Jefferson counties, the Bend MPO and the cities of Bend, Madras, Redmond and La Pine. The TRIP97 Partnership was created to:

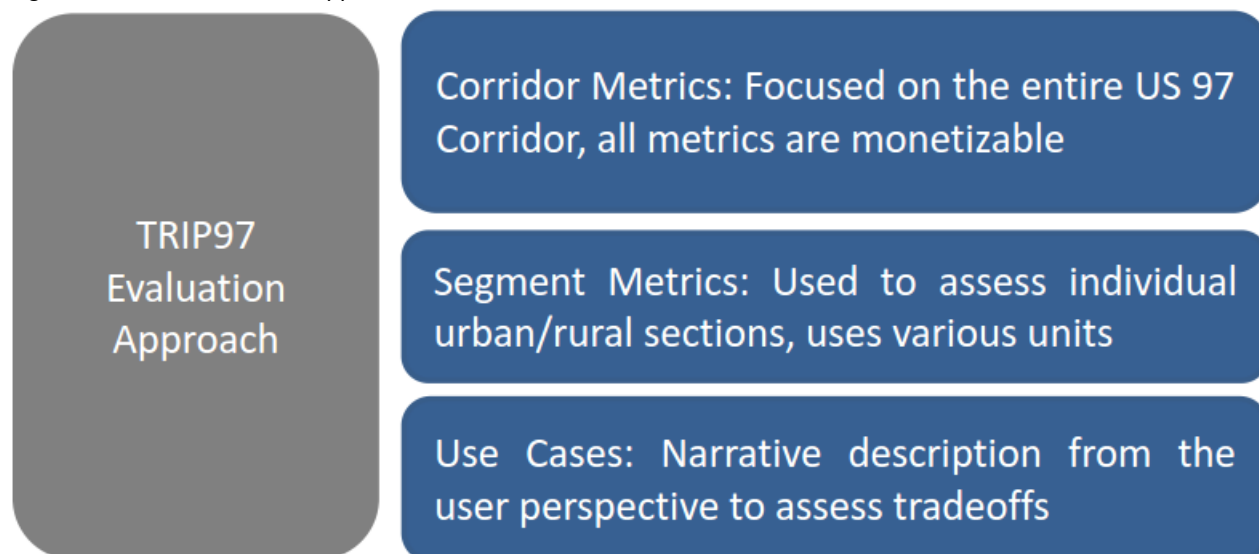
- Increase system performance emphasis on regional job creation, safety, accessibility, and alternative travel modes
- Make overall better use of the dollars for transportation along the corridor
- Allow a range of investments that include lower-cost management and maintenance options in addition to capital strategies
- Prioritize corridor investments by the partnership to address system needs across jurisdictional lines
- Utilize growth allowed by TRIP97 to help fund the identified system improvements

The goals and associated performance measures of TRIP97 are:

- Mobility:
 - Average Travel Time: average expected time for a vehicle to traverse the corridor in one direction during the analysis period
 - Travel Time Reliability: how travel time changes based on varying expected conditions, such as weather, traffic incidents, demand, work zones, demand fluctuation and capacity variations
 - Side-Street Delay: the amount of delay travelers experience while waiting to turn onto or to cross US 97
- Economy:
 - Funding Plan Review: generated revenue from growth (job creation, larger tax base, etc.)
 - Job Potential: measure of the economic development benefit created by a transportation improvement
- Safety:
 - Predicted Crash Frequency and Severity: comparison of historical crash experience with the results of predictive safety models from the Highway Safety Manual (HSM) to estimate the net change in expected crashes by frequency and severity (property damage only, injury, and fatality)
- Environment:
 - Carbon Dioxide Emissions: quantify and monetized evaluation of emissions
- Network Redundancy:
 - Percent of north-south travel on US 97: estimate the percentage of the total north-south travel within a specific segment that is carried by US 97
- Accessibility:
 - Public Street Turning Movement Opportunities per Mile: connectivity of the surrounding surface street transportation system to US 97
- Travel Options:
 - Multimodal Level of Service: estimates the service levels of non-auto travel modes along US 97

The plan establishes an evaluation approach for how the above performance measures are analyzed and how the results of that analysis are combined and summarized into meaningful direction for transportation investment and decision-making. The intent of this evaluation approach was to ensure the results could inform decision-makers as to which projects provide the greatest return on investment.

Figure 2. TRIP97 Evaluation Approach Overview



Using this process, a group of projects and strategies was identified as well as an initial funding plan to understand the potential funding sources that could be available to the projects and future project needs. Projects relevant to the US 97/Parkway Plan listed in Table 2-4.

Table 2-4. TRIP97 Recommended Parkway Projects

Recommended Project	Why	Cost Estimate (millions)
Cooley Road Interim - Bend	<ul style="list-style-type: none"> Job potential change Improves travel time, travel time variability, side street delay 	\$45
Powers Road Interchange – Bend	<ul style="list-style-type: none"> Improves average travel time, travel time variability, side street delay Reduces expected crash frequency Improves public street turning opportunities Enhances pedestrian and bicycle travel 	\$30
Variable speed limit – Corridor	<ul style="list-style-type: none"> Improves travel time and reduces travel time variability Reduces expected crash frequency 	\$1
Median (Bend to Sunriver)	<ul style="list-style-type: none"> Reduces expected crash frequency Reduces travel time variability 	\$5
Incident Management – Corridor	<ul style="list-style-type: none"> Reduces travel time variability and average travel time Reduces expected crash frequency 	\$2
Green extension for trucks at signals – Corridor	<ul style="list-style-type: none"> Improves travel time, travel time variability, and side street delay Reduces expected crash frequency Reduces GHG 	\$1

Next steps identified by TRIP97 include:

- Development of a regional Partnership in addressing the complex funding, management, and formal governance needs of the US 97 corridor.
- Regional coordination of land use as it impacts the overall system.
- Development of a regional governance and decision making structure to prioritize and preserve the corridor.
- Develop a regional travel demand forecasting model.
- Refine the evaluation analysis tool (so that it has the capability to handle more segments and adds batching capabilities to make evaluation more efficient).
- Collect data to conduct refined corridor analysis such as turning movement counts (to be collected) and travel forecast information (to come from travel demand forecasting model).
- Develop corridor-wide 2035 population and employment forecasts which are essential input for the regional travel demand forecasting model.
- Develop a refined project list as a natural outcome from applying the new tools described above.
- Refine funding sources and develop a funding implementation plan.
- Select a specific governance structure that meets the needs of the Partnership and identified funding approach.
- Obtain necessary local, regional, and state agency endorsements.

2.1.8 US 97 Freight Plan

ODOT has initiated a two part project to prepare a comprehensive freight plan for US 97 within Oregon. Phase 1 is the description of existing conditions. This phase of the project is nearing completion. The entire Parkway was within a single study segment – Segment 7, which extends between mile post 132.19 and 143.47. Below are the existing conditions findings relevant to Segment 7.

The average annual daily traffic (AADT) in Segment 7 was over 30,000.¹ However, as identified in the 2040 Bend Metropolitan Transportation Plan, some locations of the Parkway experience average volumes of over 45,000–50,000 vehicles per day. Over 8 percent of the vehicle type in the segment are trucks, when converting trucks to passenger car equivalents, the percentage is closer to 18 percent. Vehicles travel nearly 317,000 miles in the segment daily and experienced nearly 550 hours of delay daily.

Nearly 60 percent of all collisions on the Parkway are rear-end collisions. Expected, Predicted and Excess crash frequency were calculated using the Highway Safety Manual (HSM) method and ODOT software. The results are shown in Table 2-5. There were two Safety Priority Index System (SPIS) locations on the parkway in the 2011 to 2013 period. One is located on the Powers Road on ramp and is in the top 10 percent. The other is located northbound and southbound on the Parkway north and south of the Robal Lane.

¹ This is an average of all points along Segment 7 (within Bend city limits). However, the 2015 AADT at the Revere Ave ATR station was 46,200 and the July 2015 ADT at Revere Ave ATR station was 55,642. Much higher than the segment average.

Expected crash frequency represents average annual observed crashes over time adjusted by certain factors. In Segment 7 crashes are likely to occur with multiple vehicles. Predicted frequencies are the number of crashes that “should” take place based on the roadway type, volumes and other characteristics. Excess crash frequency is the number of average annual crashes in that segment beyond what would be anticipated for that roadway type. It is calculated by subtracting the predicted from the adjusted observed (or expected) crash frequency. Excess crash frequency is a useful tool because it highlights areas that might be particularly conducive to mitigation. As shown, Segment 7 has a high expected crash frequency. In fact, it was the highest of all segments studied by over double. The cause of and potential mitigation for the excess crashes should be studied further.

Table 2-5: Urban Segments Excess Crash Frequency per Million VMT per Year

US 97 Segments	Length (mi)	Expected - Not Driveway Related		Expected - Driveway Related	Total Expected (Adjusted Observed)	Total Predicted	Excess Crash Frequency
		Multiple Vehicles	Single Vehicle	Multiple Vehicles			
3 – Madras	4.2	13.7	2.7	0.4	16.6	4.8	11.8
5 – Redmond	5.2	32.2	4.8	1.0	37.3	14.5	22.8
7 - Bend	10.5	78.0	10.9	0.4	89.3	40.1	49.2
10 – Klamath Falls	7.6	5.3	9.3	0.3	14.8	6.6	8.1

Primary issues in Bend identified by project stakeholders, such as the City of Bend, included:

- There are no designated rest stops, truck stops or ODOT rest areas along the Parkway and opportunities should be identified in the general area.
- There is a lack of bicycle and pedestrian crossing of the Parkway, and it is difficult to get across the Parkway for all modes, particularly in the southern segment.
- Congestion on the Parkway is significant and traffic models show it getting worse.
- There are few parallel streets to the Parkway that allow for local traffic, as opposed to through traffic.
- Speeding vehicles are an issue.

2.2 DESCHUTES COUNTY

2.2.1 Deschutes County Comprehensive Plan and Transportation System Plan, 2012

The 2010 – 2030 Deschutes County TSP was adopted in 2012. Deschutes County defers all land use and transportation planning to the cities with jurisdiction, however there are roads within cities that are county owed. The TSP classifies US 97 as a Principal Arterial. Relevant County roads within the Parkway Study Area include:

- Tumalo Road
- Deschutes Market Road
- Hunnel Road north of Loco Road
- 18th Street south of Egypt Drive to Bend city limits
- Baker Road & Knott Road

Relevant projects identified on or affecting County roads and highways in the study area are detailed in Table 2-6.

Table 2-6. County Road and Highway Projects

Road Name	Location	Functional Classification	Project	Estimated Cost	Priority
Old Bend-Redmond Hwy	Tumalo Road	Arterial / Collector	Intersection Turn Lanes	\$250,000	Medium (6-10 yrs)
Hunnell Road	Cooley to Rodgers	Collector	New Road	\$752,500	High (0-5 yrs)
Cooley Road	18th St to Deschutes Market Road	Arterial	New Road	\$653,413	Low (11-20 yrs)
Regional TDM program	Countywide	n/a	County share of funding Commute Options at \$8K per year	\$160,000	High (0-5 yrs)
Regional TDM program	Countywide	n/a	Install ride share lots at future locations based on 2011-12 study	\$45,000	Medium (6-10 yrs)

2.2.2 Deschutes County Intelligent Transportation Systems Plan, 2011

The Deschutes County Intelligent Transportation Systems (ITS) Plan was originally developed in 2005 and updated in 2011. Deschutes County has seen high population growth rates and growth is projected to continue, which will affect mobility on the county and state roadways and highways. As shown in Figure 2, over half (60 percent) of congestion results from temporary disruptions to traffic flow, caused from weather, work zones, special events and incidents, thus demonstrating a significant need for improvements specifically tied to these problem areas.

The plan was developed to identify innovative tools to address increasing traffic congestion and safety issues that affect traveler mobility within Deschutes County. ITS is defined as a system of “advanced technologies and management techniques to relieve congestion, enhance safety, provide services to travelers, and assist transportation system operators in implementing suitable traffic management strategies.” ITS projects have been instrumental in other ODOT regions by providing lower cost options that improve the safety and efficiency of the transportation network in a relatively short implementation timeframe without major capital infrastructure investment. This plan details a 20-year deployment plan of ITS projects. The investments range from CCTV cameras, variable message or speed limit signs, to count stations and weather stations. A number of these investments have been identified for installation on the Bend Parkway and some of the adjacent roadways as show on Figure 4-B on the next page. The figure also shows the ITS tools that exist on the corridor today.

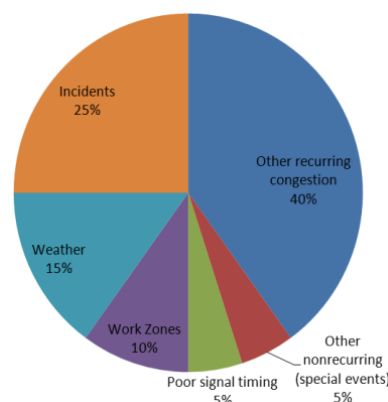
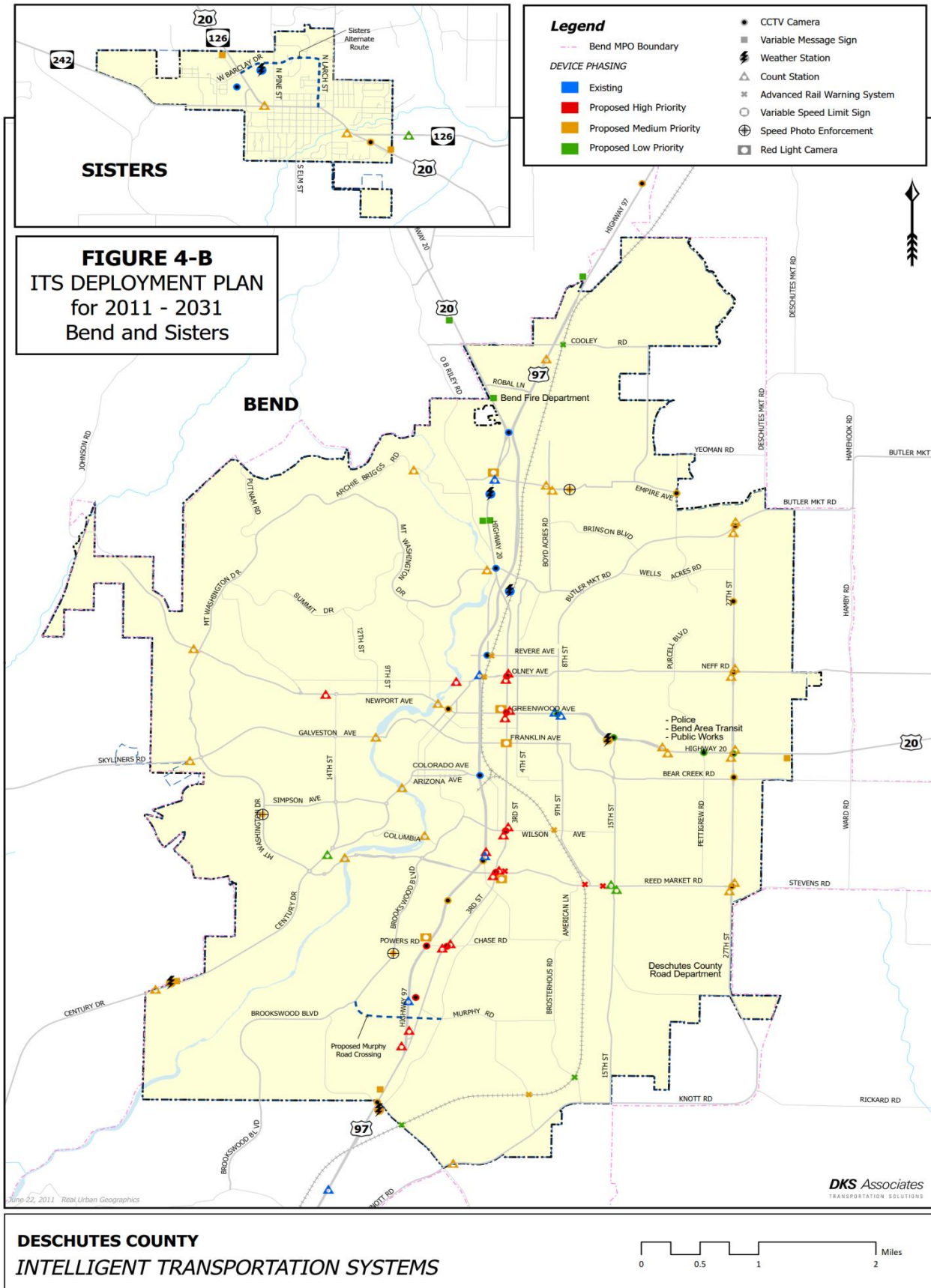


Figure 3. Causes of Congestion in Deschutes County



2.3 BEND METROPOLITAN PLANNING ORGANIZATION & CITY OF BEND

The US 97 Parkway Plan (Parkway Plan) study area is largely within the Bend Metropolitan Planning Organization (MPO) boundary. The Bend MPO boundary was expanded in May of 2015 to include a longer segment of US 20 north past Tumalo State Park. The Bend MPO is responsible for coordinating regional transportation planning and project programming for the city of Bend, its entire urban growth management area and some limited areas of un-incorporated Deschutes County.

2.3.1 2040 Metropolitan Transportation Plan – Bend MPO

The Bend Metropolitan Transportation Plan (BMTP) is a multi-modal transportation plan designed to meet the anticipated 25-year transportation needs within the BMPO planning area boundary.

The population of the Bend area is expected to increase by nearly 70 percent between 2010 and 2040. This increase in population will have a significant impact on the transportation system. By 2040, population is expected to grow to 140,861 persons within the Bend UGB (up from 76,639 in 2010 [Census]). Growth in total employment within the Bend urbanized area is forecast to increase steadily over the next 30 years. Much of this growth is expected to occur in the trade and service sectors. The highest growth in employment is expected in Transportation, Communications and Utilities sectors and in the Construction industry. Overall, employment within the BMPO area is expected to grow from 40,763 jobs in 2010 to 80,783 jobs by 2040.

Financially constrained transportation projects identified in the BMPO related to US 97 include:

- US 97-Powers Road Intersection: Preliminary engineering and right of way acquisition for overcrossing or interchange. This project would initiate engineering and right of way acquisition for an overcrossing or interchange for US 97 and Powers Road (project # 14).
- US 97-Murphy Road: Construct northbound on and southbound off ramps to and from US 97 and Murphy Road (project # 25).

Also included in the plan as aspirational roadway projects are:

- US 97 Bend North Corridor Improvements: Bend Northern UGB to Empire Avenue. Improvements associated with this project were studied as part of the Environmental Impact Statement for the US 97 Bend North Corridor Project to provide and plan for a safe, affordable, long term traffic solution for US 97 at the north end of Bend. This project is described in more detail within section 3.1.
- Empire Avenue: 3rd Street to US 97 NB ramps. Widen to 5 lanes and install signal at SB ramps
- US 97/Cooley Road area improvements. Implement the “mid-term” project
- US 97 NB off-ramp to Empire Avenue: Widen existing ramp to 2 lanes
- US 97/Powers Road Intersection: Preliminary engineering and ROW acquisition for overcrossing or interchange
- US 97/Murphy Road: Construct northbound on and southbound off ramps
- US 97 Corridor Improvements: Empire Avenue to Colorado Avenue. The scope and scale of anticipated projects within this segment of US 97 have not been identified.

Below is an overview of relevant chapters of the Bend 2040 MTP.

2.3.1.1 Chapter 5: Forecast Land Use

In the decade between 1990 and 2000, Bend experienced a 154 percent population growth, from 20,469 to 52,029 people. Although not as high of a growth rate, between 2000 and 2010 Bend added another 24,610 people, a population growth of 47 percent. The following table summarizes the 2010-2040 updated population forecast from the Office of Economic Analysis and utilized by BMPO and the City of Bend:

Table 2-7. Bend UGB 2000-2040 Population Forecast

Year	Bend UGB	Population Growth	Percent Population Growth
2010	76,639		
2028	115,063	38,424	50.1%
2040	140,861	64,222	83.8%

The Bend urbanized area is forecast to add over 40,000 jobs by 2040, from 40,763 in 2010. High growth industries are the Transportation, Communications, Utilities sector (250 percent growth) and the Construction industry (228 percent growth). Service industry employment is projected to grow by 83 percent. Manufacturing employment is forecast to grow 63 percent. Finance, Insurance, Real Estate (F.I.R.E.) is forecast to grow 64 percent.

Table 2-8. Bend UGB 2000-2040 Employment Forecast

Sector	2010	2040	Change	Percent Population Growth
Agriculture/Forestry	406	655	+249	61%
Mining	46	367	+321	698%
Construction	2,311	7,596	+5,285	229%
Manufacturing	3,178	5,197	+2,019	64%
Transportation, Communications, Utilities	1,002	3,543	+2,541	254%
Wholesale Trade	1,001	3,069	+2,068	207%
Retail Trade	6,288	12,958	+6,670	106%
FIRE	2,276	3,741	+1,465	64%
Service	22,708	41,666	+18,958	83%
Government	1,547	1,991	+444	29%
Total Employment	40,763	80,783	+40,020	98%

Locations with high traffic volumes today are expected to be the locations with the highest traffic volumes in the future. The highest traffic volumes in the region are forecast to occur on Highway 97 (the Parkway). High traffic-volumes are also expected on Highway 20 (3rd Street/Greenwood Avenue), Reed Market Road, 18th Street, O.B. Riley Road, Empire Avenue, and 27th Street. Vehicle miles of travel (VMT) in the MPO are currently (year 2010) estimated to be approximately 108,000 miles during the PM peak hour. By 2040, PM peak hour VMT within the MPO is expected to increase by 59% to approximately 171,500 miles.

2.3.1.2 Chapter 6: Motor Vehicles

Motor vehicle operational analysis found that several segments of US 97 will not meet operational standards in 2040. In 2040, the Average Annual Daily Traffic (AADT) volumes along this four-lane facility are projected to be between 45,000–50,000 vehicles per day. Segments of US 97 that will perform at demand-to-capacity ratios exceeding 1.0 are between Cooley Road and Butler Market Road as well as

between Revere Avenue and Truman Avenue. The high traffic volumes along the Bend Parkway and US 97 were not directly addressed in the MTP Update. Additional north-south capacity, in the form of parallel local improvements, and other management strategies will be considered in a future US 97 Parkway Refinement Study (this study). Figure 6-3 and 6-4 at the end of this section identify the committed projects and planned (illustrative) projects in the Bend MPO. Those that are relevant to this study are identified in Table 2-9.

Table 2-9. Project List for State, County and Local Facilities

Project #	Location & Project Description	Limits	Estimated Cost
5	Murphy Rd Phase 1 - Re-align Murphy Rd, Murphy overcrossing US 97, hwy access modifications, Murphy/3rd roundabout		Funded (under construction)
7	Empire Avenue - Construct 2 lane extension	Purcell Boulevard to 27th Street	\$6,700,000
12	US 97/Cooley Road area improvements	Cooley Road	\$30,000,000
14	US 97 @ Powers Road Intersection - Preliminary engineering and ROW acquisition for overcrossing or interchange	Powers Road Intersection	\$6,500,000
17	North frontage road - New 2 lane road	Murphy Road to Powers Road	\$5,400,000
18	South frontage road - New 2 lane road	Murphy Road to Parkway off- ramp	\$13,800,000
22	Mervin Samples Road/Sherman Road - Upgrade to 2 lane collector roadway and install traffic signal at US 20	O.B. Riley Road to Empire Avenue	\$6,100,000
25	US 97@ Murphy Rd - Construct northbound on and southbound off ramps	Murphy Road	\$6,100,000
44	US 97 (Parkway)/Robal Road intersection - High capacity intersection improvement	Robal Road intersection	\$4,800,000
47	US 97 - Complete construction of interchange or overcrossing	Powers Road Intersection	\$12,500,000
Illustrative Project	Cooley Road - Construct 3 lane road extension	18th Street to Deschutes Market Road	\$11,867,000
Illustrative Project	Hunnell Road – Construct 2 lane road extension	Cooley Road to Rodgers Road	\$8,000,000
Illustrative Project	South frontage road - Construct new 2 lane road	Ponderosa Street Baker Road	Unknown
Illustrative Project	US 97 Bend North Corridor Improvements	Bend Northern UGB to Empire Avenue	\$120-\$180 million
Illustrative Project	US 97 Bend Corridor Improvements	Empire Avenue to Colorado Avenue	Unknown
Illustrative Project	Colorado - US 97 Parkway NB Ramps	NB Ramps	\$3,400,000

2.3.1.3 Chapter 7: Pedestrian and Bicycle System

Bend has a robust bicycle and pedestrian system with striped and separated bike lanes, sidewalks and multiuse trails. Year 2012 ACS 5-year estimates data shows that approximately 1.7-percent of workers in the MPO area commuted to work by bicycle, while about 2.6-percent walked to work. Nearly 80 percent of people in the MPO travel to work in 15 minutes or less, whether it's by vehicle, transit, bike or walking.

A complete and safe network of trails, sidewalks and bicycle facilities will further encourage these trips to be taken by modes other than the personal vehicle. The MPO identified bike and pedestrian paths that exist or are planned as shown on Figure 7-2 at the end of this section. Planned bicycle and pedestrian projects relevant to the Parkway Study include:

- Multi-use trail adjacent to the BNSF Railway between the MPO's northern boundary and Colorado Avenue.
- Multi-use trail under the Bend Parkway along Arizona/Colorado Avenue and Scott Street.
- Bicycle path on Clausen Drive.
- Bicycle path on Murphy Road.

2.3.1.4 Chapter 8: Transit

The primary transit service provider for the Bend MPO is Cascades East Transit (CET). CET provides local (City) fixed-route service, regional (intercity) fixed-route service, and flexible demand-responsive service. Fixed-route transit does not operate on the Bend Parkway.

2.3.1.5 Chapter 9: Transportation Systems Management

The Oregon Transportation Planning Rule defines transportation systems management (TSM) as the use of "techniques for increasing the efficiency, safety, capacity or level of service of a transportation facility without increasing its size." Table 2-10 lists the relevant ITS projects to the Bend Parkway Plan. The ITS projects utilize the following general strategies to improve the operational efficiency and management of the Bend area transportation network:

- Corridor management - including traffic signal coordination, remote monitoring, and traveler information dissemination - on key corridors
- Rail warning systems
- Parking management
- Transit system management
- Multi-jurisdictional programs for traffic management, incident response, emergency management, and maintenance and construction management
- Regional traveler information dissemination

Table 2-10. ITS Deployment Projects Relevant to Bend Parkway

#/Title	Description	Capital Cost & Implementation Target
DC-TM-02B: Bend Pkwy and 3rd St: Reed Market Rd to Murphy Rd (Stage 1)	<ul style="list-style-type: none"> • Subscribe to leased services between ODOT Region 4 TOC and communications hub TBD between Reed Market Road and Murphy Road • Install VDSL in existing conduit and existing aerial route along 3rd Street/The Dalles-California Highway between Reed Market Road and Power Road • Install fiber optic cable in existing conduit along Powers Road between 3rd Street/The Dalles-California Highway Bend Parkway 	\$140,000 to \$160,000 (2014 – 2018: 0 – 5 Year Plan, Short-term)

#/Title	Description	Capital Cost & Implementation Target
	<ul style="list-style-type: none"> • Install fiber optic cable in existing conduit along Bend Parkway between Powers Road and Murphy Road • Upgrade traffic signal controllers at: <ol style="list-style-type: none"> 1. Bend Parkway/Powers Road 2. Bend Parkway/Pinebrook Boulevard 3. Bend Parkway/3rd Street/The Dalles-California Highway • Install PTZ cameras at <ol style="list-style-type: none"> 1. Bend Parkway/Powers Road 2. Bend Parkway/3rd Street/The Dalles-California Highway 	
DC-TM-08E: Hwy 97 (Bend Parkway) - Travel Time Performance Measurements	<ul style="list-style-type: none"> • This project will deploy devices to measure travel times for traveler information and performance measurement assessment. 	\$210,000 (2019+: 5+ Year Plan, Long-term)
DC-TM-02C: Bend Pkwy and 3rd St: Reed Market Rd to Murphy Rd (Stage 2)	<ul style="list-style-type: none"> • Install fiber optic cable in existing conduit and existing aerial route along 3rd Street/The Dalles-California Highway between Reed Market Road and Powers Road • Install fiber optic cable in existing conduit along Powers Road between 3rd Street/The Dalles-California Highway Bend Parkway • Install fiber optic cable in existing conduit along Bend Parkway between Powers Road and Murphy Road • Salvage removed VDSL equipment from 3rd Street/The Dalles-California Highway, Powers Road, and Bend Parkway for use on State Highway 372/Colorado-Arizona Couplet 	\$240,000 to \$360,000 (No Implementation Target Identified)
DC-TM-08A: Bend Pkwy from Hwy 372/Colorado Ave to Reed Market Rd	<ul style="list-style-type: none"> • Install fiber optic cable along Bend Parkway between Colorado Avenue/State Highway 372 and Reed Market Road • Install PTZ camera on Bend Parkway north of Reed Market Road • Connect to existing PTZ camera near Colorado Avenue/State Highway 372 	\$380,000 to \$580,000 (No Implementation Target Identified)
DC-TM-08B: VMS: Bend Parkway northbound at Empire	<ul style="list-style-type: none"> • Install variable message sign on Bend Parkway northbound at Empire Boulevard 	\$250,000 to \$350,000 (No Implementation Target Identified)
DC-TM-08C: Bend Parkway: Revere Avenue to Franklin Avenue	<ul style="list-style-type: none"> • Install fiber optic cable along Bend Parkway between hub at Revere Avenue/Wall Street and Franklin Avenue 	\$290,000 to \$590,000 (No Implementation Target Identified)
DC-TM-08D: Bend Parkway: Empire Avenue to Cooley Road	<ul style="list-style-type: none"> • Install fiber optic cable along Bend Parkway between Empire Ave and Cooley Ave • Connect to existing interconnect along Robal Road • Upgrade traffic signal controller at Robal Road/Berg Lane 	\$400,000 to \$1,500,000 (No Implementation Target Identified)

#/Title	Description	Capital Cost & Implementation Target
DC-TM-17A: Reed Market Road from Bend Pkwy to 3rd St	<ul style="list-style-type: none"> Install fiber optic cable along Reed Market Road between Bend Parkway southbound ramps traffic signal and 3rd Street/The Dalles-California Highway Upgrade traffic signal controller at Reed Market Road/Bend Parkway southbound ramps Connect to existing interconnect along 3rd Street/The Dalles-California Highway to Wilson Avenue Install PTZ camera on Bend Parkway south of Reed Market Road Install wireless communications to PTZ camera 	\$190,000 to \$440,000 (No Implementation Target Identified)

2.3.1.6 Chapter 11: Truck Freight Systems

Chapter 11 of the BMTP is dedicated to the truck freight system. It has not been updated since 2007. The applicable goals and objectives related to freight mobility include:

- Provide a variety of practical and convenient means to move people and goods to, from and within the MPO area.
- Identify and support the development of local freight routes
- Support the through movement of goods and people on the state transportation system
- Implement transportation improvements that foster economic development and business vitality.

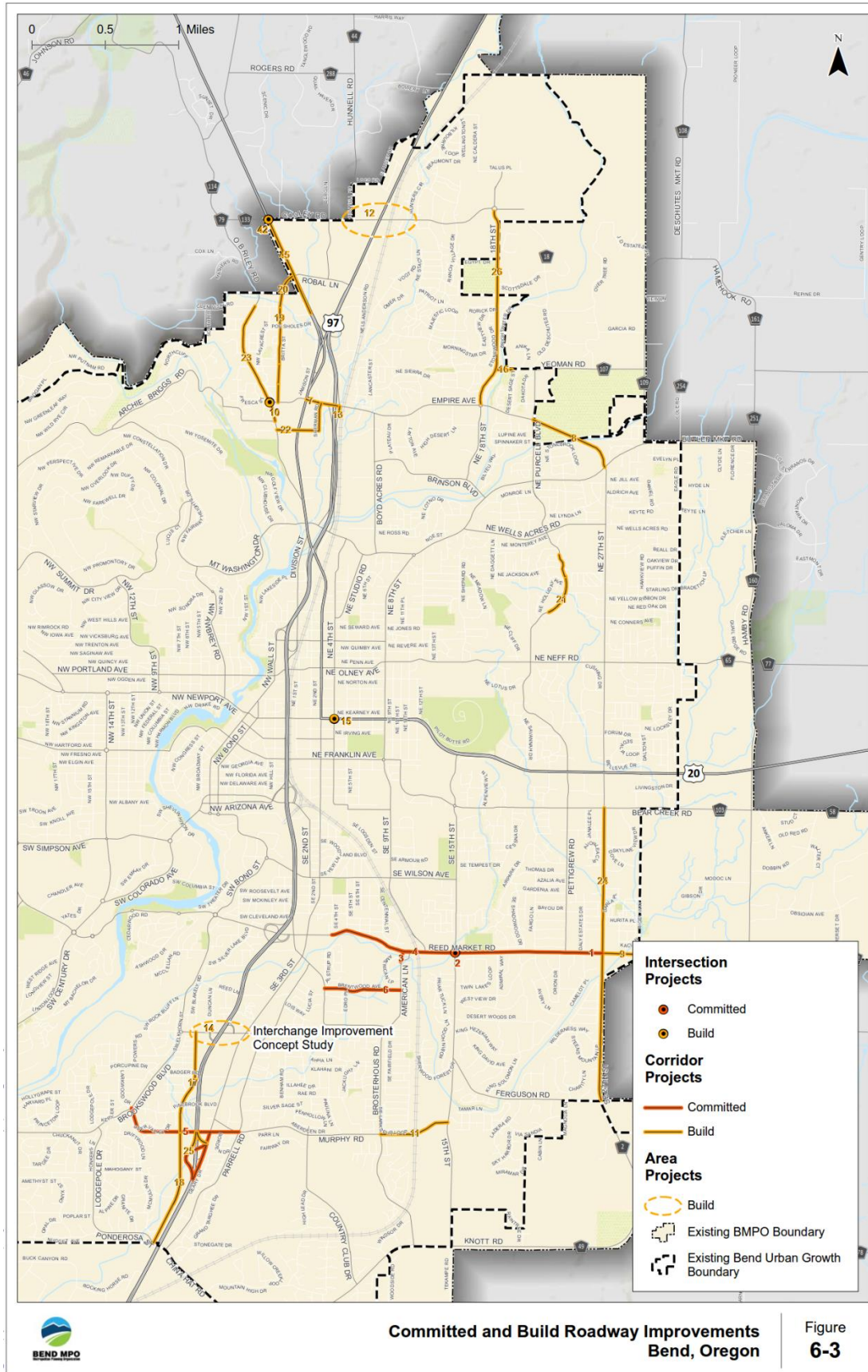
Truck freight specific policies include:

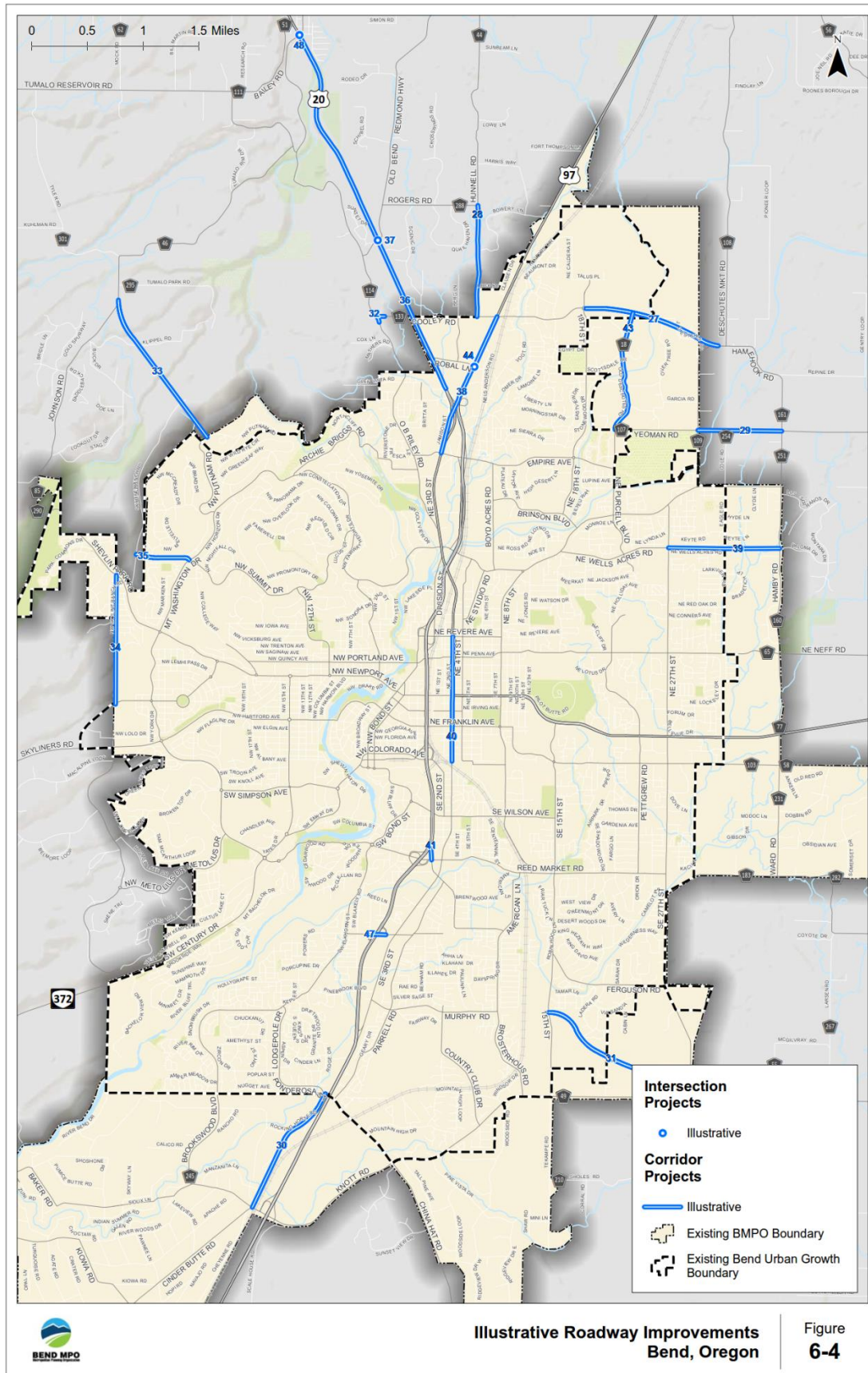
- Work with the city of Bend, ODOT, and Deschutes County to identify and implement appropriate signage for designated freight routes.
- Work with the city of Bend and Deschutes County to identify and implement appropriate design standards for designated freight routes
- Work with the city of Bend and Deschutes County to identify, and possibly implement, freight route roadway classifications

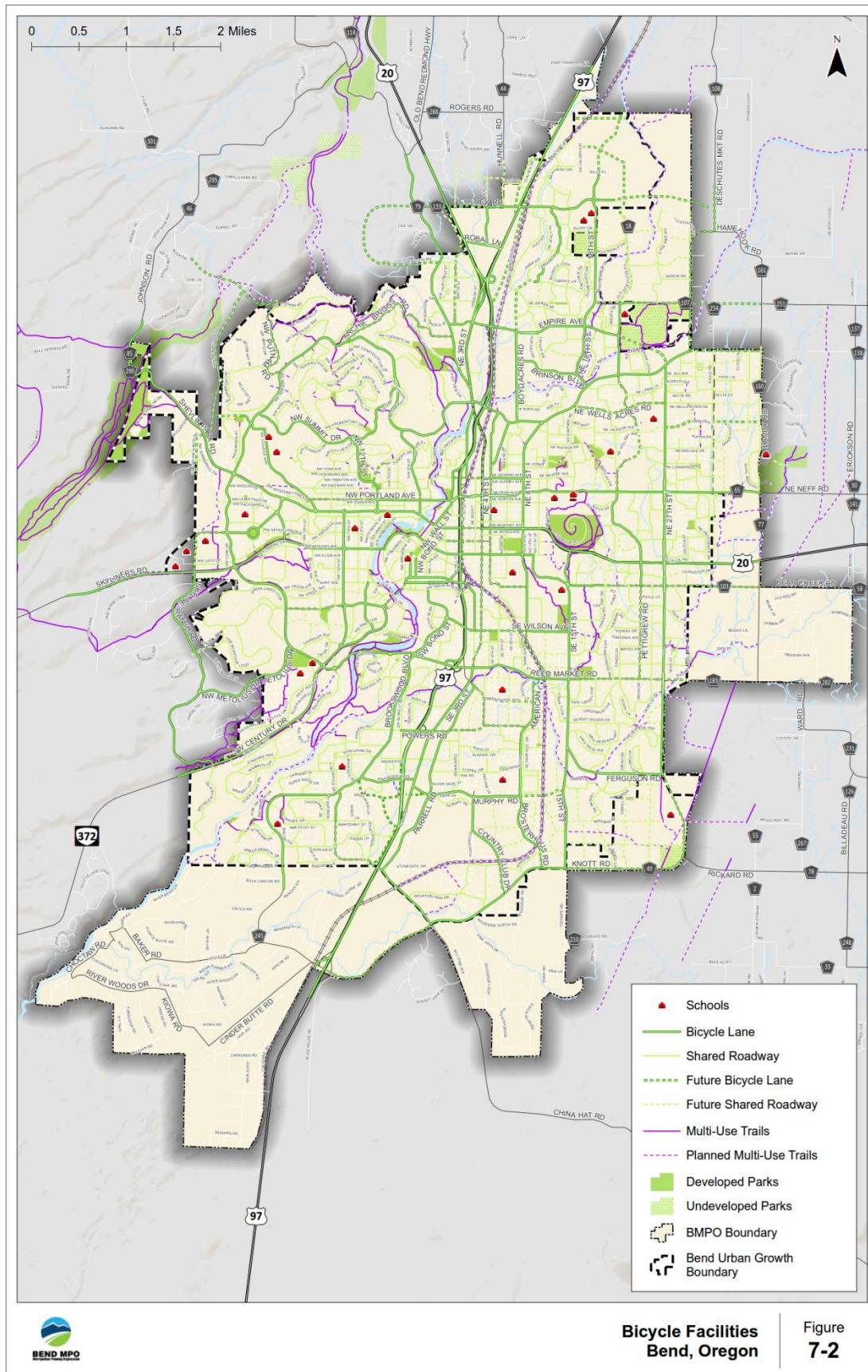
Through the urban area, US 97 is either a four-lane or five-lane section. Truck traffic in the urban area is largely confined to roadways adjacent to industrial, commercial and surface mining zoned properties. The surrounding arterial street system provides links from state highways to the nearby businesses. All of Bend's existing manufacturing and shipping areas (freight generators/receivers) are within 1 ½ miles of US 97 or US 20. In 2004, truck volumes on US 97 were as follows:

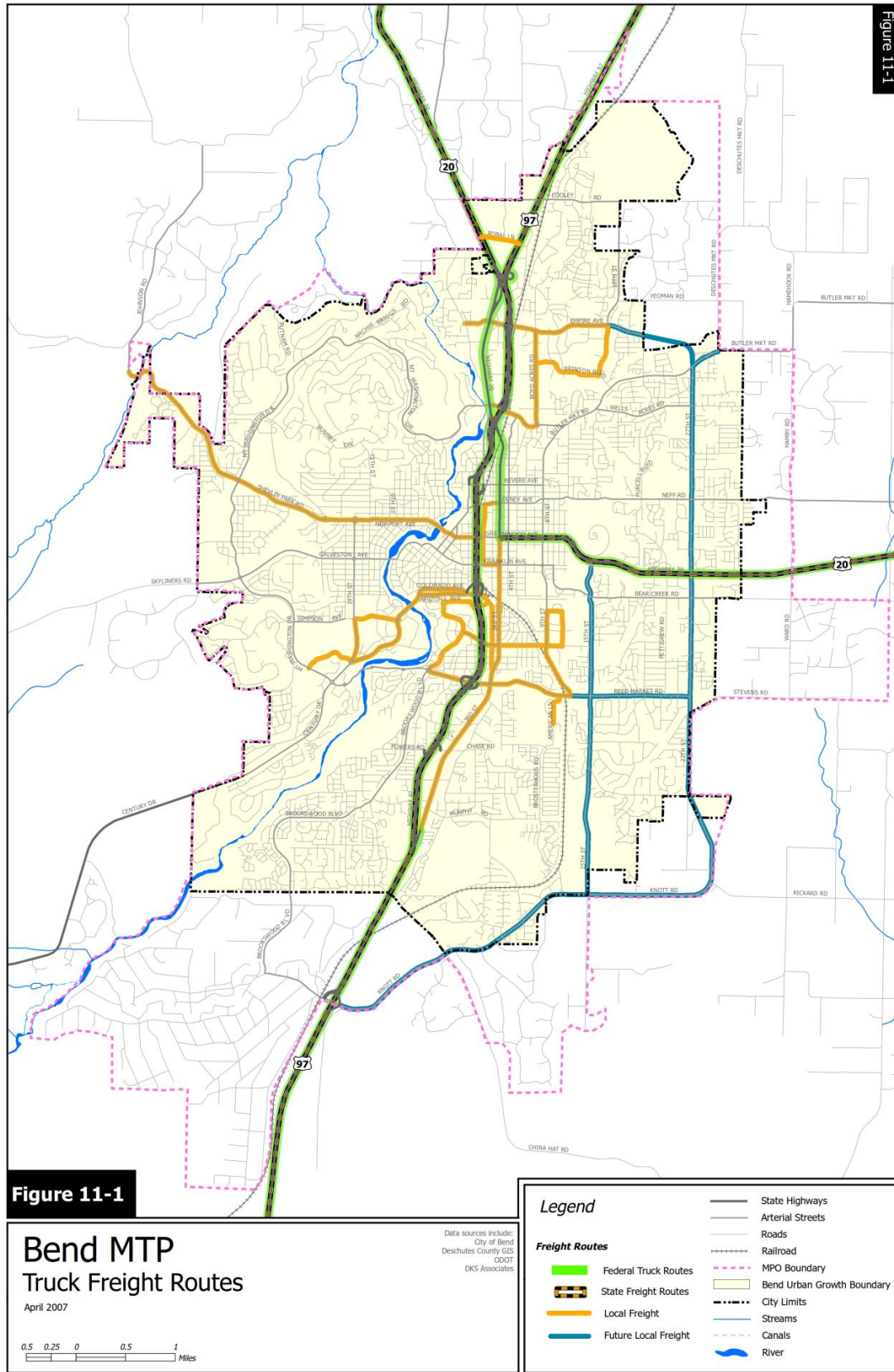
Automatic Traffic Recorder Location	2004 Average Daily Traffic	Truck ADT	Truck %
South of Revere Avenue	38,600	2,740	7.1
South of Empire Boulevard	41,300	3,550	8.6
0.9 miles south of Bend	22,150	1,795	8.1

The US 97/Bend Parkway is a truck freight route in the entirety of the study area as shown on Figure 11-1 at the end of this section.





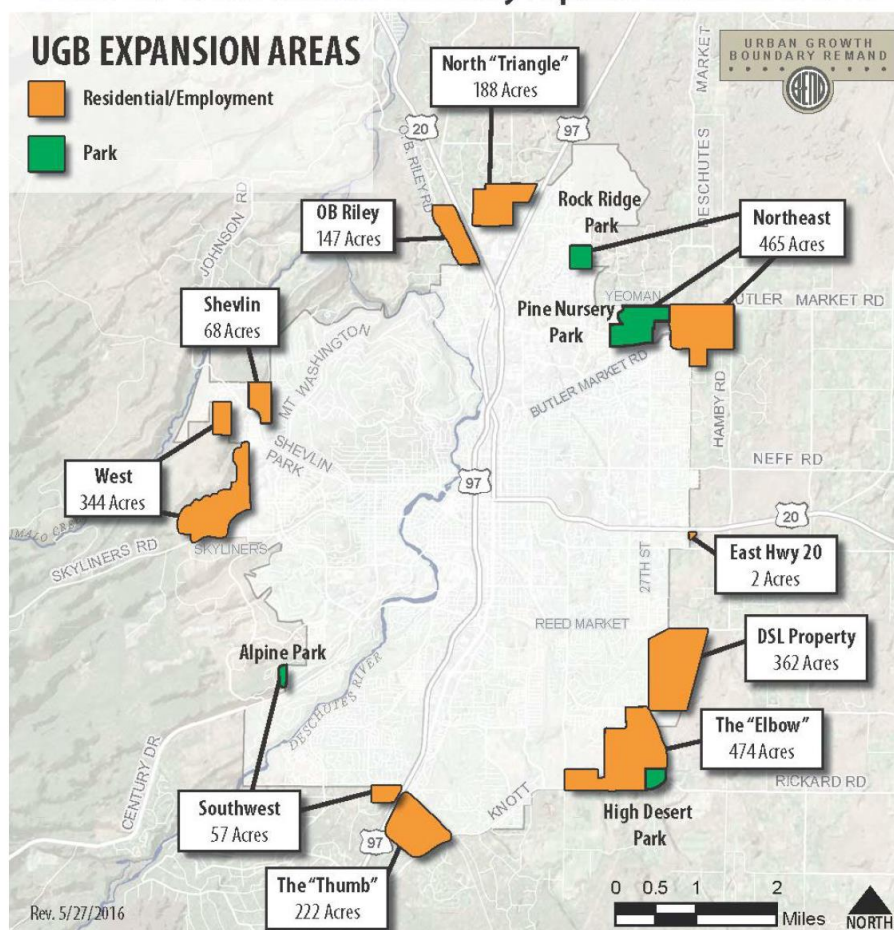




2.3.2 City of Bend Urban Growth Boundary Expansion, 2016

On November 14, 2016, the Oregon Department of Conservation and Development approved the Urban Growth Boundary (UGB) expansion plan for the City of Bend. The expansion added 2,380 acres of land for housing and employment to the UGB, as mapped in the figure below. The table details the total number of new housing and jobs that will be accommodated in the UGB expansion areas.

Preferred Urban Growth Boundary Expansion: Scenario 2.1G



Expansion Area	Total Acres ²	Residential Land (ac)	Employment Land (ac)	Park ³ Land (ac)	Housing Units ⁴	Housing Mix ⁵			Estimated Jobs
						SFD	SFA	MF	
North "Triangle"	188	86	88	0	510	46%	13%	42%	800
Northeast	465	222	22	196	1,090	50%	10%	40%	210
East Hwy 20	2	2	0	0	60	0%	13%	87%	0
DSL Property	362	223	139	0	1,000	48%	11%	41%	820
"The Elbow"	474	122	246	75	820	36%	17%	47%	2,260
"The Thumb"	222	44	177	0	270	48%	15%	37%	1,570
Southwest	57	34	5	14	240	24%	16%	60%	70
West	344	321	21	0	967 ⁶	70%	9%	21%	260
Shevlin	68	60	8	0	200 ⁶	69%	10%	21%	70
OB Riley	147	28	109	0	125	70%	10%	20%	1,020

² Total acres includes existing right of way that will be brought into the UGB with the expansion areas; however this area is not included in the residential land, employment land, or park land columns since it does not meet those land needs.

³ Park land indicates land owned by the park district; land for additional parks & schools is provided within residential land acreage.

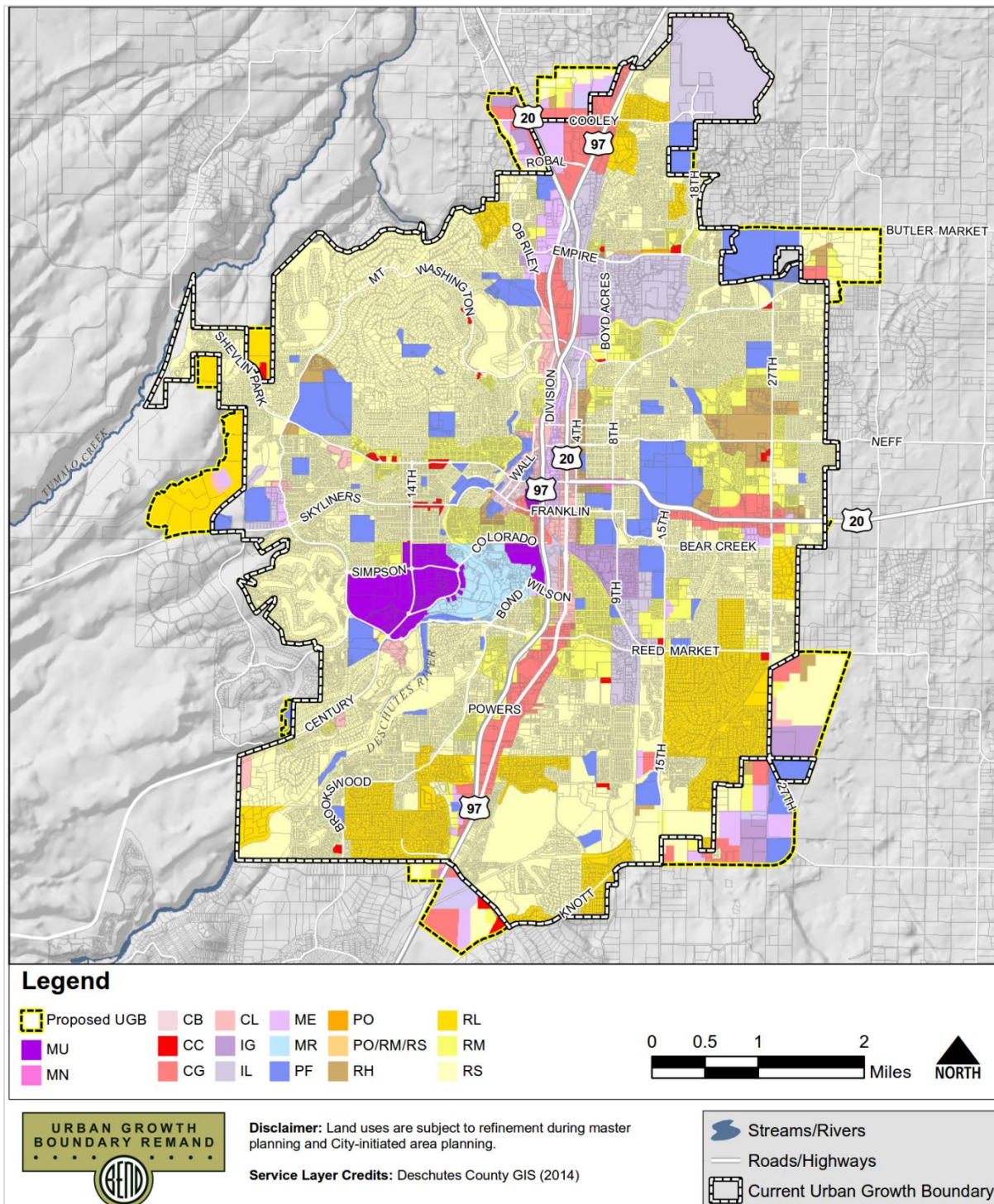
⁴ Housing units are policy minimums unless otherwise noted.

⁵ SFD = Single Family Detached; SFA = Single Family Attached; MF = Multifamily (includes duplex & triplex). Housing mix reflects policy requirements for the expansion area in total; individual properties may vary.

⁶ Housing unit numbers are policy maximums in the West and Shevlin expansion areas.

Figure 4 shows the now adopted Bend UGB, also showing the previous UGB boundary.

Figure 4. Bend Adopted UGB Expansion & Comprehensive Plan Designations



Notes: "Proposed UGB" was formally approved on November 14, 2016. "Current Urban Growth Boundary" refers to the old UGB. CB: Central Business District, CC: Commercial Convenience, CG: Commercial General, CL: Commercial Limited, IG: Industrial General, IL: Industrial Light, IP: Industrial Park, ME: Mixed Employment, MN: Mixed Neighborhood, MR: Mixed Riverfront, MU: Mixed Urban, PF: Public Facilities, PO: Professional Office, RH: Residential Urban High Density, RL: Residential Urban Low Density, RM: Residential Urban Medium Density, RS: Residential Urban Standard Density

BEND URBAN AREA TRANSPORTATION SYSTEMS PLAN



BEND URBAN AREA TRANSPORTATION SYSTEMS PLAN

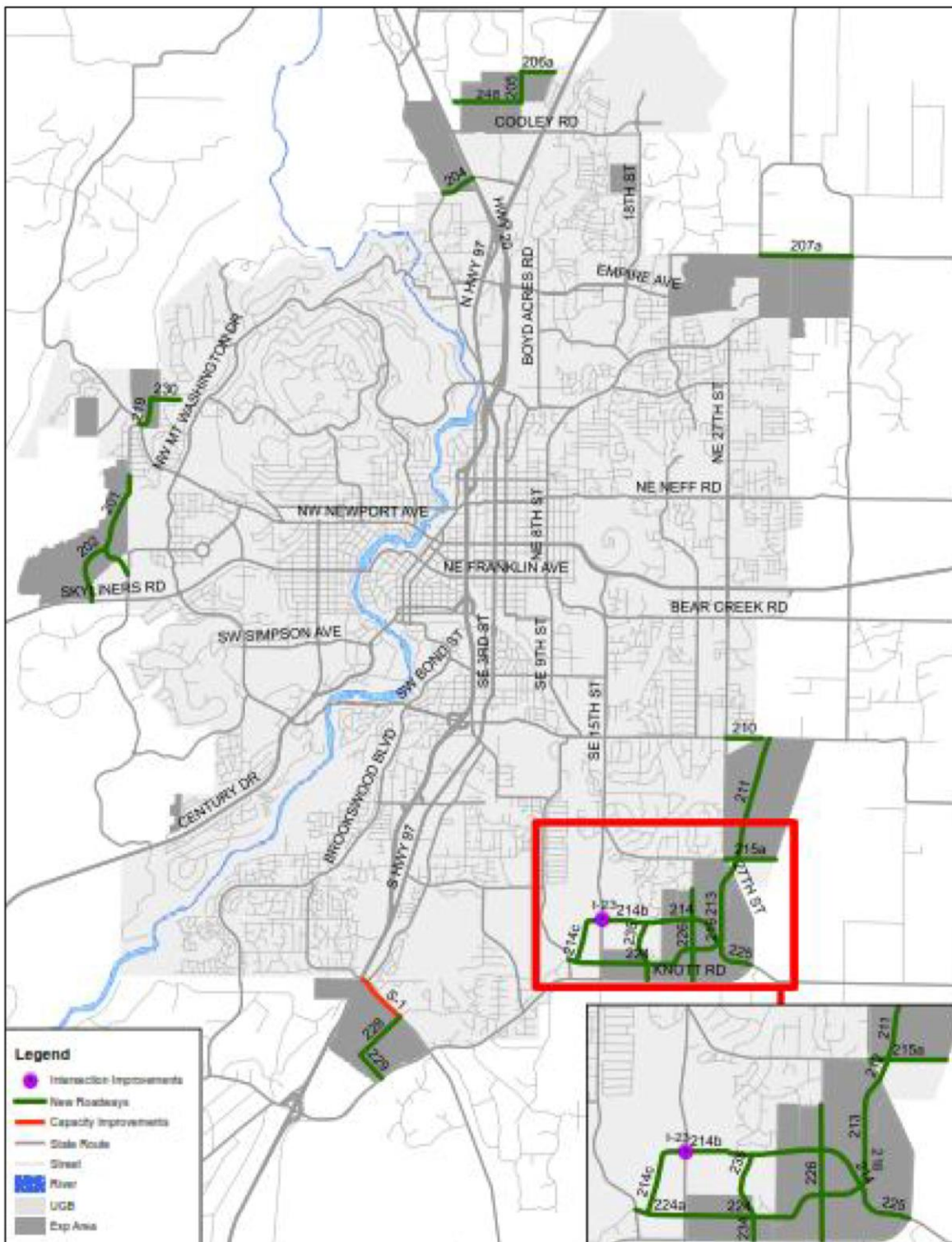


Figure 9.3: New Roadway, Corridor, Intersection Locations

In addition to the transportation system analysis performed to evaluate the impact of the UGB expansion areas, a more detailed analysis was performed on the final UGB growth scenario to meet the requirements of OAR 660-012-0060 (a section of the Transportation Planning Rule (TPR)). This TPR analysis was required to identify whether any parts of the state highway system in Bend would both exceed ODOT's adopted mobility standards (which are generally below the physical capacity of the roadway) and experience more traffic based on the final UGB growth scenario than based on the City's current UGB and current adopted comprehensive plan designations.

The TPR analysis for the final UGB scenario identified only one additional project, a roughly \$4.8 million widening of US 20 from Robal Road to about Empire Avenue. This project is already planned as part of the Bend Metropolitan Planning Organization's 2040 Metropolitan Transportation Plan (MTP) but is not expected to be funded and built prior to 2028 in the absence of the UGB expansion and the related efficiency measures.

2.3.3 Bend Comprehensive Plan, 2016

The Bend Comprehensive Plan was formally adopted in 1998. The plan has a 20-year planning horizon of 2020. The vision of the Comprehensive Plan is as follows:

Bend is a community valuing its natural features of trees, rocks, river, sounds, views and a diverse citizenry that works together creating a healthy legacy and vision for Bend's future livability. The Bend Comprehensive Plan is designed to preserve and enhance this vision for our community.

The plan has eleven chapters; most relevant to the Parkway Plan Study is Chapter 7, Transportation Systems. In 2013, the chapter underwent a comprehensive re-write and, most recently in 2016, the chapter went under minor formatting and text updates. Chapter 7 is summarized in section 2.3.3.1. Below is a brief summary of other relevant chapters of the plan:

- Housing (updated in 2016): There will be future demands for a wider range of housing, for families, retirees, and affordable housing. Goals and policies include livability with a variety of living styles and choices while maintaining residential compatibility, proximity to natural areas and transportation options, and flexibility in development standards to lessen impact on natural features.
- Economy (updated in 2016): Bends economy continues its historic role as a trade, service, education and tourist center for Central Oregon. The establishment of a 4-year extension campus for Oregon State University will increase the higher-skilled labor market of residences in Bend and will likely attract more innovative businesses and industries. The service industry will also continue to be strong. Goals and policies address the need to balance a diverse and sustainable community with overall livability, ensuring adequate supply of industrial, employment, commercial and mixed-use lands, and continue to support the regional role of the City.
- Growth Management (adopted in 2016): Addresses the growth of the region and the demands on the City as well as the recent Urban Growth Boundary expansion (presented in detail in section 2.3.2). Goals and policies reflect a need to use land wisely and efficiently while create new neighborhoods that have a mix of uses, are walkable and have access to natural areas.

2.3.3.1 Transportation Systems

The Transportation Systems chapter, also known as the Transportation System Plan (TSP), of the Bend Comprehensive Plan lays out the city's plan for multimodal transportation, including walking, biking, public transit, and driving. The modal chapters presented above in the 2040 Bend MPO plan are the same as those in the City's Comprehensive Plan, presented in section 2.3.1 of this memo.

The TSP several specific policies for the Parkway:

- Policy 7-30: develop safe and convenient bicycle and pedestrian circulation to major activity centers...East-west access to the downtown area needs particular emphasis across major obstacles, such as 3rd Street, the Bend Parkway and the railroad.
- Policy 7-67: develop and implement a plan to improve the appearance, safety and function of East 3rd Street, portions of Highway 20 and old Highway 97 when the Parkway is completed.
- Policy 7-68: work with the State to line the entrance to the city of Bend along Highways 97...and the Parkway, with large stature trees.
- Policy 7-73: accepts the findings of the US 97 Bend North Corridor Project Preferred EIS Alternative and sets forth a high-level process for coordination and development of the infrastructure project.
- Policy 7-74: establishes that the City and ODOT will coordinate prior to implementation of closures to approaches on Empire Avenue and the improvements to Mervin Sampels and connecting roads.

2.4 PORTLAND STATE POPULATION ESTIMATES

Portland State University's Population Research Center provides annual population estimates for Oregon counties, cities and towns. The relevant 2016 certified population estimates compared to 2015 estimates are as detailed in Table 2-11.

Table 2-11. Certified Population Estimates

Place	Certified Population Estimate July 1, 2016	Certified Population Estimate July 1, 2015	Population Change 2015-16	Percent Change 2015-16
Oregon	4,076,350	4,013,845	62,505	1.6%
Deschutes County	176,635	170,740	5,895	3.5%
Bend	83,500	81,310	2,190	2.6%

2.5 BEND SAFETY IMPLEMENTATION PLAN: EXISTING CONDITIONS, OPPORTUNITIES AND CHALLENGES

This plan identifies existing conditions and provides an assessment of pedestrian crossing opportunities and challenges along several roadway corridors in Bend. Relevant to the Parkway Study are the findings along 3rd Street between Greenwood Avenue and Murphy Road. Opportunities and challenges identified in the study area include:

- The existing center turn lane provides the opportunity for median refuge islands to break up the five lane crossing of 3rd Street. This would make crossings easier for all users, including children, elderly, and disabled populations.

- This former state highway can be considered for a lane reconfiguration. This would simplify pedestrian crossings and allow for the addition of buffered bike lanes, which would address the high number of bicycle crashes on this corridor.
- Existing bus stops provide logical crossing locations.
- Bus stops can be relocated closer to adjacent intersections.
- Wide curb radii on both corners of Greenwood Ave allow motorists to take right turns at higher speeds where they may fail to notice crossing pedestrians or bicyclists.
- There are numerous curb cuts and driveways along the corridor.

2.6 PARKWAY AGREEMENTS

There are numerous established agreements between federal, state, county, city and the railroads that formally describe the management responsibilities of each agency. While some are less critical to this study, such as landscape maintenance responsibilities, others are critical to the everyday operations of the Parkway. The most relevant agreements are summarized, below.

2.6.1 Access Management Agreement 10167

This is a cooperative policy to manage access to Principal Arterial standards on the Bend Parkway and obligates the city and county to follow policy in land use decisions. ODOT has review and approval authority over all traffic control facilities or access designs on the Bend Parkway.

Road approaches shall be designed and constructed to standards described in the Highway Design Manual, the 1984 AASHTO policy on Geometric Design of Highways and Streets, Oregon administrative Rules 764 Division 50, as well as local laws on access and land use. These standards address driveway width, site distance, turning radii, etc. In addition, the following standards shall apply (with minimal exceptions) to future private road approaches:

- The minimum distance between adjacent private road approaches shall be 150 feet.
- The minimum distance between any private road approach and a public street or road intersection shall be 300 feet.
- The minimum distance between any private road approach and the beginning or ending point of an interchange ramp shall be such that it will not adversely affect the operation of the ramp, as determined by the State.

2.6.2 Cooperative Improvement Agreement 11732: Preliminary Engineering and Construction Finance

This agreement established the agreement between the City, County and State to construct the Bend Parkway. The agreement details how land transfers would be executed. It was originally established in June of 1993. Several amendments have occurred over time:

- Amendment 1, 1994: Obligated the County to improve frontage road between Butler Market Road and Addison St.
- Amendment 2, 1994: Further obligates the County to install a signal at Butler Market Rd.
- Amendment 3, 1998: Amendments to boiler plate language, among other minor changes.
- Amendment 4, 2000: Details construction and jurisdictional responsibilities. Connections, Colorado Interchange, access road jurisdiction, maintenance and ownership of local roads.

- Relinquishment Deed, 2007: State relinquish to the City its right, title and interest in the connecting streets for portions of right-of-way between SW Taft Ave. and SW Roosevelt Ave. (11,300 sq. ft.) for public road purposes only.
- AR 723 – Relinquishment Deed: ODOT relinquishes its interest in Robal Lane to the city and county.

2.6.3 Jurisdictional Transfer Agreement 712

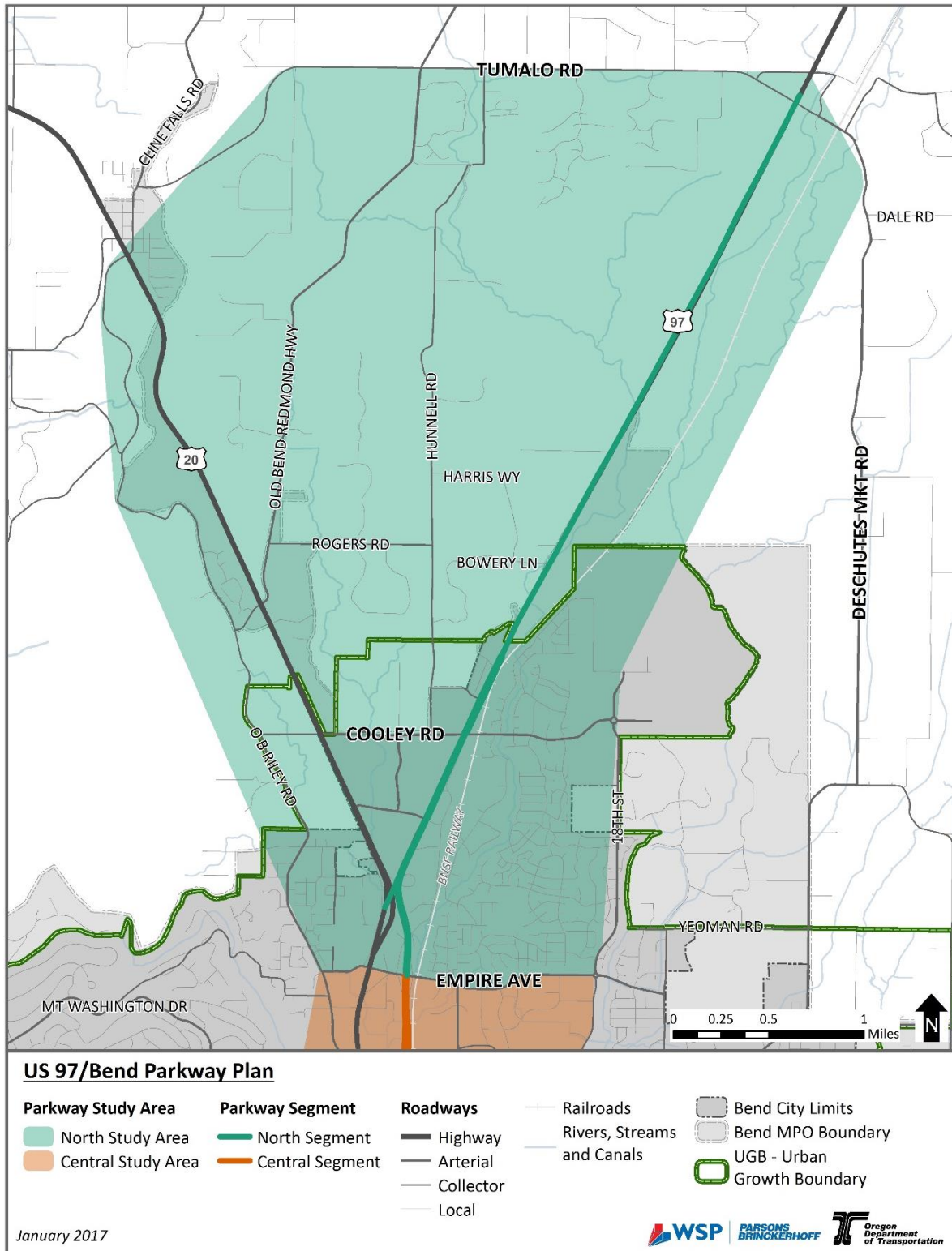
This 2003 transfer agreement formally transfers the Third Street right-of-way, maintenance and repair responsibilities, and liability to the City from the intersection of Greenwood Avenue, south to its intersection with the Parkway. This agreement formally renames the section of roadway “US 97 Business.” A subsequent amendment removed the south end of Third Street from the state highway system.

2.6.4 Construction/Maintenance Agreement 1431

This 1997 agreement between ODOT and the BNSF Railway allows for the relocation of a BNSF train depot, track, and facilities. This will enable ODOT to eliminate an at-grade crossings and construct a new highway overcrossing. This also establishes an agreement for ODOT to acquire roadway easements and property from BNSF.

3 NORTH PARKWAY

The North portion of the Parkway Plan study area is between Tumalo Road and Empire Avenue.



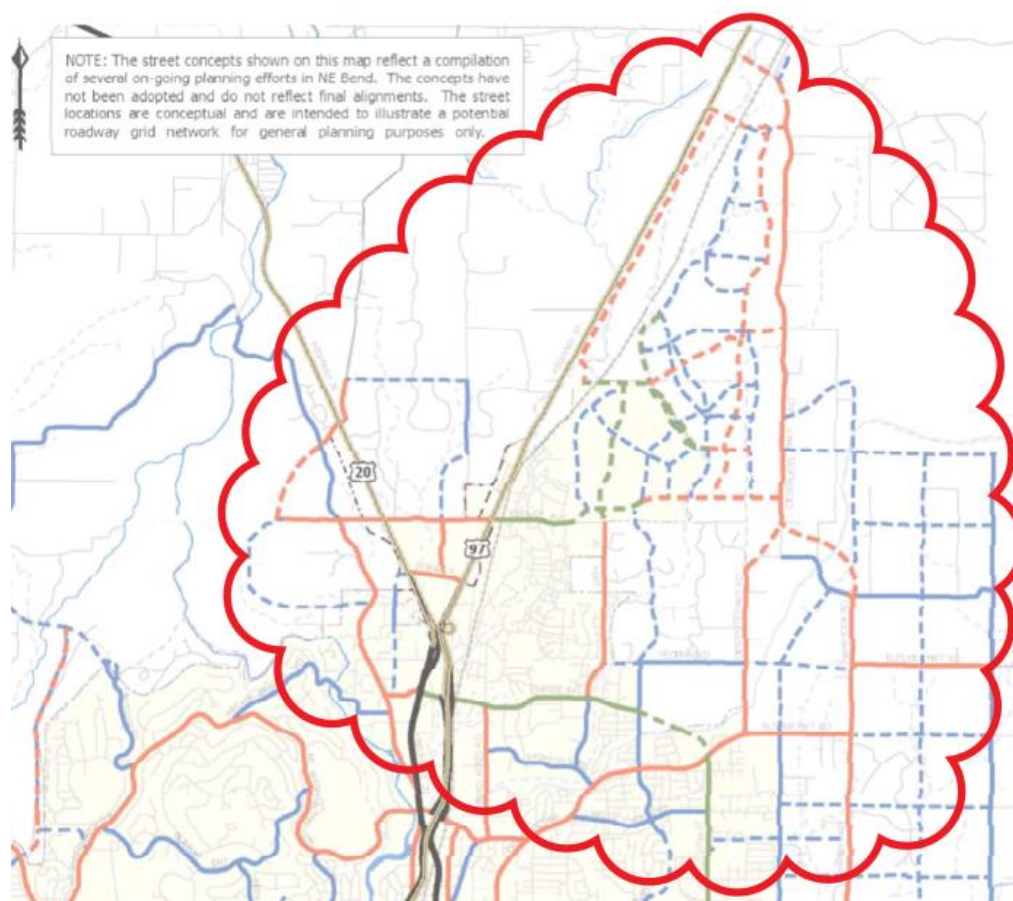
3.1 NE BEND TRANSPORTATION STUDY, 2009

The NE Bend Transportation Study, led by the City of Bend, was an umbrella effort to coordinate transportation system planning, land use planning, and project development work in the north-east part of the City of Bend led by either ODOT, City of Bend, Deschutes County or the Bend MPO, but involved two or more of them for coordination purposes. The investigation identified strategies to support better use of the local (i.e., non-highway) transportation system for shorter distance travel and decrease local trip reliance on the state highways. Ongoing and previous projects were identified within the study are shown in Figure 5 and listed in Table 3-1.

Table 3-1. Summary of Ongoing & Previous Projects in NE Bend

Lead Agency	Ongoing & Previous Projects
City of Bend	<ul style="list-style-type: none"> • City of Bend Transportation System Plan (TSP) Updates • Bend UGB Expansion Study • Juniper Ridge Master Plan • US 97/Cooley Road Mid-Term Improvement Study • Juniper Ridge Employment District Special Planned Area (SPA) & TPR Analysis
ODOT	<ul style="list-style-type: none"> • US 97 & US 20 Refinement Plan • US 97 North Corridor Study
Deschutes County	<ul style="list-style-type: none"> • Deschutes County TSP
Bend MPO	<ul style="list-style-type: none"> • MPO updates to the Regional Transportation Plan

Figure 5. NE Bend Transportation Study Area



The study identified a set of common transportation planning principles, context assumptions, and evaluation criteria. Next, the study developed a range of transportation system alternatives and evaluated them by the evaluation criteria. Ultimately, the plan presents a list of key conclusions and recommendations. The package of “most promising” strategies identified through this study relevant to the Bend Parkway Plan are listed in the bullets, below. Supplemental notes are provided in italics, if relevant information is summarized elsewhere in this Summary Report.

- Identifying, and committing to, feasible Transportation Demand Management and Transportation System Management policies at a regional level (*see section 0, Deschutes County ITS Plan, and section 2.3.1.5, the summary of the Bend MPO Chapter 9, Transportation System Management, for more*)
- Enhancing local roadways to provide attractive alternatives to highway routes for local trips. Two strategies that showed benefit at a high level included:
 - Enhancing local roadways that connect to, and/or parallel, the highways.
 - Identifying a new north-south arterial corridor through NE Bend in the general vicinity of 18th Street.
 - To have benefit, the N-S arterial needs to tie to US 97 at a northern interchange location and be further west than Deschutes Market Road as that is too far east to draw a lot of traffic from US 97.
 - This connection could be created using 18th Street but it doesn’t have to be restricted to that alignment if subsequent detailed work shows another location is preferable.
 - Developing two parallel corridors (such as 18th Street and Purcell Boulevard) is another possible option for creating this connection.
 - Two parallel corridors could provide redundancy in the system and allow for two smaller roads as opposed to one larger road.
 - Further details about location and character of the connection (or connections) will be evaluated as part of the Juniper Ridge TPR work and associated efforts.
- Providing additional east-west crossings of the highways at strategic locations to complement interchange locations.
- Providing strategic connections from the local system to the state highways. These should be spaced at about one mile intervals and connect to key non-highway routes.

3.2 US 97 BEND NORTH CORRIDOR PROJECT FEIS, 2014

ODOT, in coordination with Deschutes County and the City of Bend undertook the US 97 Bend North Corridor Project. This project would improve an approximate 6-mile corridor on US 97 in Deschutes County, Oregon between the Deschutes Market Road/Tumalo Junction interchange and the Empire Avenue interchange to address congestion, traffic flow, and safety on this highway corridor. A number of alternatives were studied to develop a project that is achievable within a 20-year funding period.

The preferred alternative would reroute US 97 east of its current alignment, adjacent to the existing railroad tracks. Where US 97 is realigned, the current US 97 roadway would be used as a portion of the extension of 3rd Street. Within the City of Bend UGB, jurisdiction over this converted segment of US 97

is proposed to be transferred to the City of Bend. ODOT would retain jurisdiction of the newly realigned portion of US 97.

US 97 would connect to 3rd Street at a signalized intersection. The design would also include enhanced pedestrian and bicycle improvements, design improvements for Empire Avenue, and a signalized intersection at 3rd Street and Mervin Sampels Road.

The following chart compares the preferred alternative to not building this project in terms of relevant traffic related long term impacts:

No Build Alternative	Preferred Alternative
12 intersections below operational standards (2—US 97, 4—US 20, 6— local road system) due to increased congestion during peak periods	5 intersections below operational standards (1—US 97, 3—US 20, 1—local road system)
n/a	2 US 97 mainline and merge/diverge/weave segments over standards
15 intersections blocked by queues	0 intersections blocked by queues
5 mph overall average network speed	19 mph overall average network speed
66,100 overall network stops	35,500 overall network stops
4,700 hours overall network delay	1,100 hours overall network delay
5,300 hours overall network travel time.	1,900 hours overall network travel time

3.3 BEND NORTH AREA TRANSPORTATION STUDY

Once ODOT finalized the FEIS for the *US 97 Bend North Corridor Project*, the MPO, City, and ODOT recognized that additional detail was needed to identify how the long- and mid-term improvements could be prioritized, funded, and ultimately constructed in a way that builds toward or directly implements the established long-term vision. The Bend North Area Transportation Study (BNATS) planning effort evaluated 18 concepts for improving connectivity, safety, operations, and system management in the Bend North area.² The study team also developed criteria to evaluate these concepts' effectiveness based on the following principles:

- Route Choices
- Connectivity
- Safety
- Balanced System Flow
- Multimodal System
- Do Not "Preclude"
- Maximize Investment Value
- Respects Community, Natural, and Financial Constraints

Based on the evaluation, 13 potentially viable concepts were identified to address near- and medium-term needs. Some of the concepts could be implemented independently or in phases, while others will be more effective when combined and/or phased with other concepts. The near-term concepts and

² The future volumes used in this study were based on an older version of the Bend MPO model than the one used for the more recent Bend UGB analysis. The more recent travel demand model analysis indicated lower traffic volumes in the BNATS study area, particularly on Highway 20.

phasing considerations are shown in Table E2, and medium-term concepts are summarized in Table E2 through E6.

Table 3-2. Package A (US 97 Corridor North and Western Triangle) Concepts and Phasing

Concept	Type	Description	Cost ¹	Notes
1A	Capacity	US 97/Cooley Road: Remove split phasing	\$200K	Analysis shows that US 97/Cooley Road will be the first intersection to exceed capacity as the surrounding area develops. This project provides modest safety and capacity benefits, and the change in phasing will allow better coordination with the signal at Robal Road. The City and ODOT may also consider alternative mobility targets at this location.
2A	Capacity	US 97/Robal Road: Remove Split Phasing and add second eastbound left	\$400K	This project also provides modest safety and capacity benefits, and the change in phasing will allow better coordination with the signal at Cooley Road. The northbound left turn storage can be increased as part of this project, or later as part of 3C. The City and ODOT may also consider alternative mobility targets at this location.
13	Transit/TDM	Transit Connectivity/ Location Improvements Near Robal/Hunnell	\$250K	Co-located major transit stop and park-and-ride central to Triangle with strong bicycle and pedestrian connections.
11	Connectivity	Connectivity Within Triangle	\$2.1M	Creates multimodal grid within the triangle with many route choices, connecting destinations and reducing dependence on arterial system. Connectivity in the largely undeveloped western section of the triangle is assumed to be implemented with new development. This project focuses on a new north-south connection north of Robal Road and a new east-west connection south of Lowe's.
3C	Safety	US 97/Nels Anderson Place: Left-Turn Access Restrictions and Related Improvements	Est. \$300K	Can be implemented in three stages with various sub-options: (1) Extend the northbound left-turn storage bay to reduce the likelihood of queue spillover. (2) Close existing northbound left access at US 97/Nels Anderson Place retaining the access as Right-in, Right-out only. (3) Consider the viability and impact of alternate routes to the Robal Road traffic signal or into the mall available from US 20, Robal Road, Nels Anderson (east).
15	Safety	Rear-End Crash Mitigation	\$400K	Enhance Signal Ahead signage, auxiliary signal heads, and other driver awareness treatments at the US 97/Cooley Road and US 97/Robal Road intersections
Total Cost			\$4.6M	

¹ Costs shown are for planning purposes only. Costs exclude right-of-way, utility relocation, and other details.

Table 3-3. Package B (US 20 Corridor North) Concepts and Phasing

Concept	Type	Description	Cost ¹	Notes
6	Capacity and Safety	US 20/Cooley Road: Roundabout or Traffic Signal	\$5.5M	This concept addresses significant future delay at the Cooley Road approach to this unsignalized intersection while maintaining high levels of safety. ODOT preference to evaluate a roundabout due to better safety, will require freight coordination.
5A	Safety	US 20/Old Bend-Redmond Highway	\$80K	This concept closes the intersection's west leg, allowing the center turn lane to be used for a two-stage left turn from Old Bend-Redmond Highway onto US 20 toward Bend. Concept 5A should be implemented after Concept 6, as the reduced delay on Cooley Road approaches to US 20 will benefit trips that can no longer use Old Bend-Redmond Highway to access US 20. Would require a Deschutes County TSP amendment and may require other improvements to accommodate rerouted traffic.
16	Connectivity	Extend the multi-use pathway from Cooley to Old Redmond-Bend	\$275K	This multiuse pathway allows cyclists to cross at the US 20/Cooley intersection and proceed north to the Old Redmond-Bend Highway. Should be constructed with 5A.
Total Cost			\$5.9M	

¹ Costs shown are for planning purposes only. Costs exclude right-of-way, utility relocation, and other details.

Table 3-4. Package C (West of US 20) Concepts and Phasing

Concept	Type	Description	Cost ¹	Notes
4	Connectivity/ Capacity	Signal or Roundabout at OB Riley/Empire	\$2M	This concept addresses capacity needs at OB Riley Road/Empire Avenue, particularly for the stop-controlled westbound movement on Empire Avenue. Improving flow for this movement will help manage queuing that may impact other network connectivity improvements west of US 20. Requires realignment.
7	Connectivity/ Capacity	US 20/Robal Road: Add West Leg (Britta Extension), Roundabout or Signal	\$5.5M	Concept 7 extends Britta Street west of US 20, setting the stage for the new connections and related travel patterns in Concept 12. The concept is unlikely to improve operations at US 20/Robal Road, but will reduce dependence on US 20. It will also provide a bicycle and pedestrian connection into the retail area.

Concept	Type	Description	Cost ¹	Notes
12	Connectivity	Connectivity Southwest of the Triangle	\$6.9M	The following priorities can be implemented as follows: (1) Complete the Britta Street to US 20/Robal Road connection (2) Extend a connection from the north end of Jamison Street to Britta Street, creating new circulation for trips affected by Concept 8 (3) Complete the Halfway Road extension between Jamison and OB Riley. (4) Extend Robal Road to OB Riley Road (pending review of environmental issues).
8	Safety	US 20/Jamison St: Access Closure or restriction	\$50K	The recommendation for this concept is to convert the Jamison Street access to right-in/right-out only. New connections (Concept 12) to the Robal Road extension (Concept 7) must be in place before Concept 8 is implemented.
Total Cost			\$14.4M	

¹ Costs shown are for planning purposes only. Costs exclude right-of-way, utility relocation, and other details.

Table 3-5. Package D (South of Triangle) Concepts and Phasing

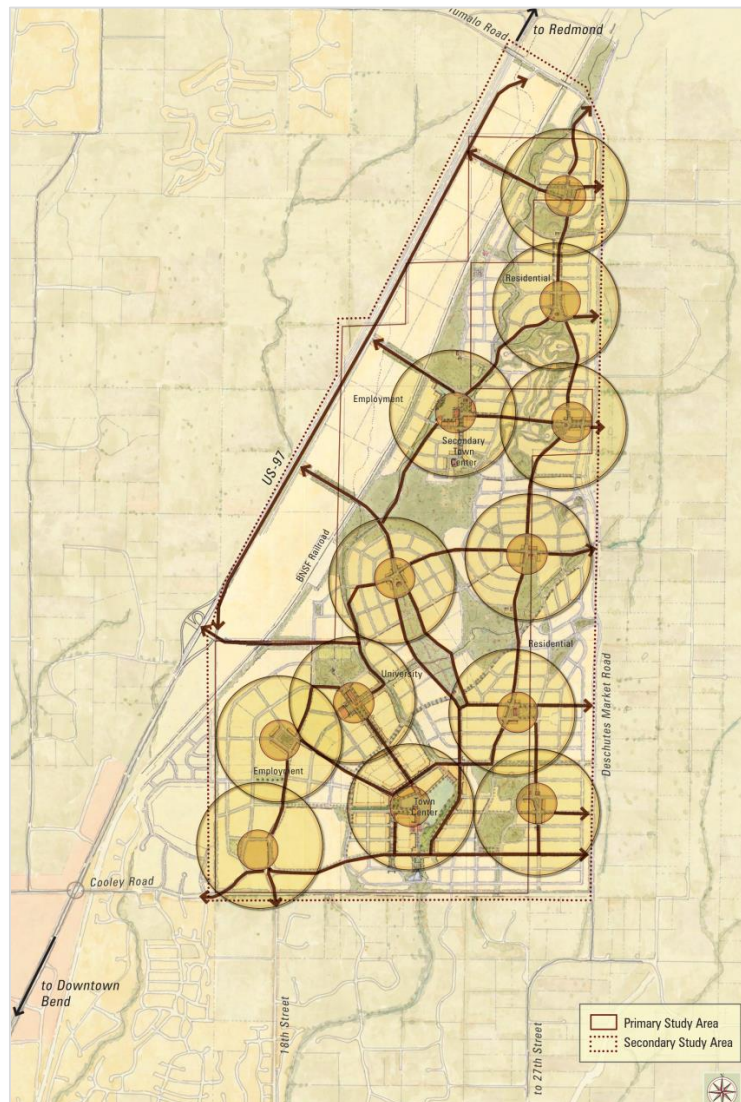
Concept	Type	Description	Cost ¹	Notes
10	Capacity	3rd Street (US 20)/Empire Avenue: Additional Southbound Left Turn	\$1.3M	Concept 10 should be implemented before Concept 9. Concept 10 should be phased as follows: (1) Improve Mervin Sampels Road and add a signal at the 3rd Street/Mervin Sampels Road intersection (2) Modify Nels Anderson Road to right-in/right-out access at 3rd Street (3) Close access on south side of Empire Avenue 200 feet west of 3rd Street (4) Modify 3rd Street/Empire Avenue to provide second southbound left turn lane and second receiving lane on east leg of intersection This concept would require coordination with affected properties and additional review.
9	Capacity	US 97 Southbound/Empire Avenue: Signal	\$550K	After Concept 10 is implemented, the second receiving lane from 3 rd Street/Empire Avenue can be extended eastbound to the US 97 Southbound/Empire Avenue intersection. This second lane will carry through US 97 Southbound/Empire Avenue, creating additional capacity benefits when Concept 9, which signalizes the intersection, is implemented. This concept would require coordination with affected properties and additional review.
Total Cost			\$1.9M	

¹ Costs shown are for planning purposes only. Costs exclude right-of-way, utility relocation, and other details.

3.4 JUNIPER RIDGE

Juniper Ridge is 1,500 acres of City-owned land bounded generally by US 97 to the west, Cooley Road to the south, Deschutes Market Road to the east, and the Tumalo Road interchange with US 97 to the north, as shown on Figure 6. The master plan was drafted in 2007 and updated in 2008. It builds on years of planning studies by the City, MPO and ODOT. The summaries below all relate to the specific planning and policy efforts for Juniper Ridge.

Figure 6. Juniper Ridge Master Plan Study Area



3.4.1 Juniper Ridge Master Plan, 2008

In 2005 the City of Bend issued a Request for Qualifications to prepare a master plan for Juniper Ridge that built upon years of work by the city, consultants, and interested citizens. The design of Juniper Ridge is inspired by the principles of smart growth. The plan acknowledges that well-designed transportation system is critical to supporting many of these smart growth principles. One goal of the plan is to minimize impacts to US 97 and maximize local road connectivity. In addition, Juniper Ridge was designed to limit vehicular trips production, which is anticipated to minimize the number of automobiles

Juniper Ridge could add to US 97 and the Bend Parkway. Connections to north-south roadways such as Deschutes Market Road and 8th Street are intended to create attractive alternatives to US 97.

Residential and business traffic would use one of three US 97 interchanges for access to and from Juniper Ridge:

- Deschutes Junction,
- A planned new interchange on US 97 between Deschutes Market Road, and
- Empire Boulevard, and Cooley Road interchange.

These three interchanges are planned for improvements that will be coordinated with the future infrastructure improvements associated with the US 97 North Corridor Project.

3.4.2 Juniper Ridge Urban Renewal Plan, 2005

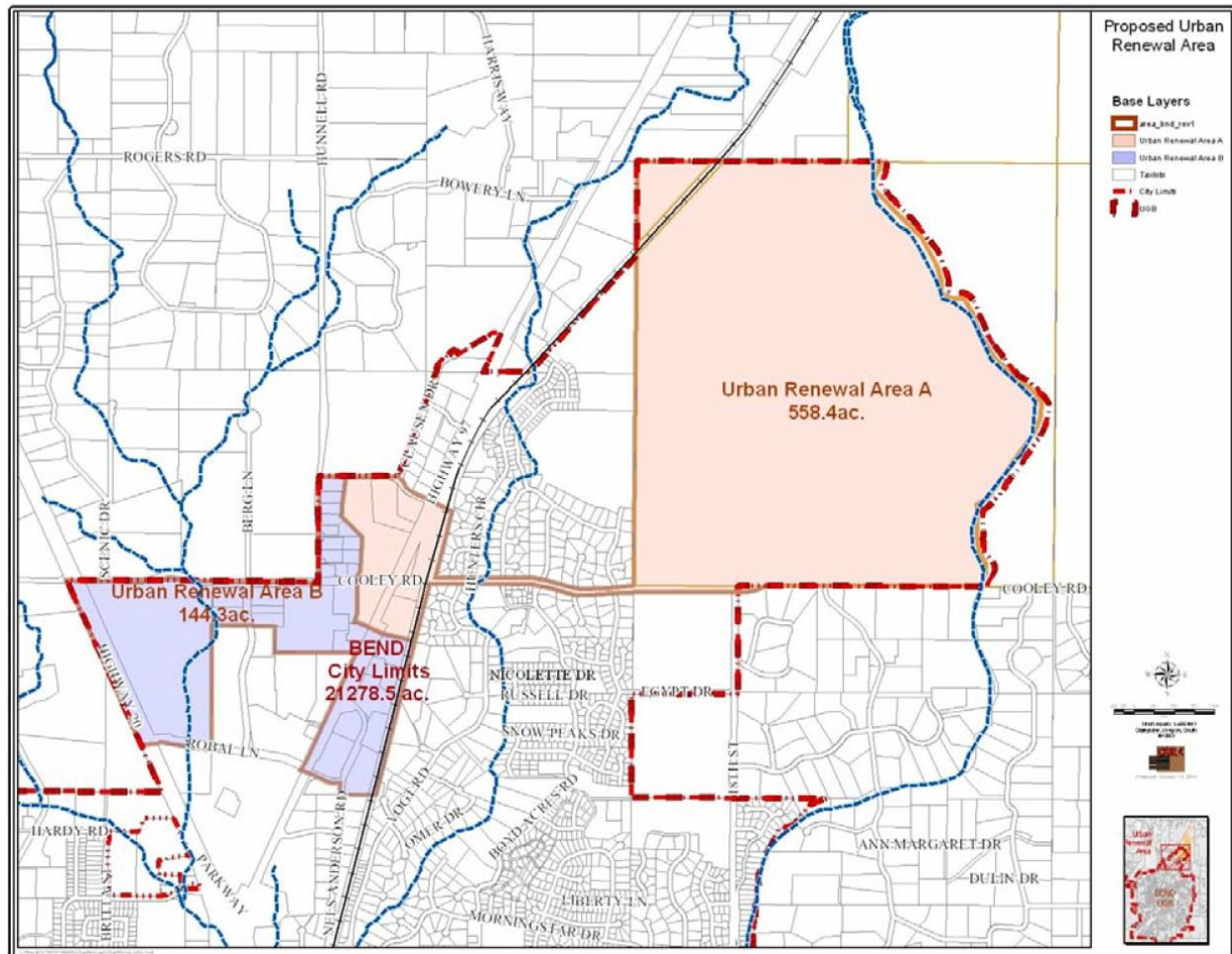
In 2005, the City of Bend adopted the Juniper Ridge Urban Renewal Plan to guide and facilitate development within the urban renewal area (URA), shown on Figure 7. Relevant projects included in URA-A include:

- Highway 97 Interchange and Intersection Improvements
- Burlington Northern Santa Fe (BNSF) Railroad Grade Separation (Cooley Road)
- Cooley Road Widening, Realignment and Improvements
- Roundabouts on Cooley
- Cooley Road Extension
- Linear Trail/ Greenway Network which may include pedestrian pathways, recreational trails and greenway buffers along the area's western edge (to protect lands along the COID canal).

Relevant projects that can be undertaken in URA-B include:

- Cooley Road Upgrade
- Bicycle Lane Improvements, including planned bike lanes on Cooley Road (Hwy 20 to Highway 97), Hunnell Road (Robal Lane to Cooley Road) and Robal Lane (Hwy 20 to Highway 97).

Figure 7. Juniper Ridge Urban Renewal Area



3.4.3 Juniper Ridge IGA, 2010

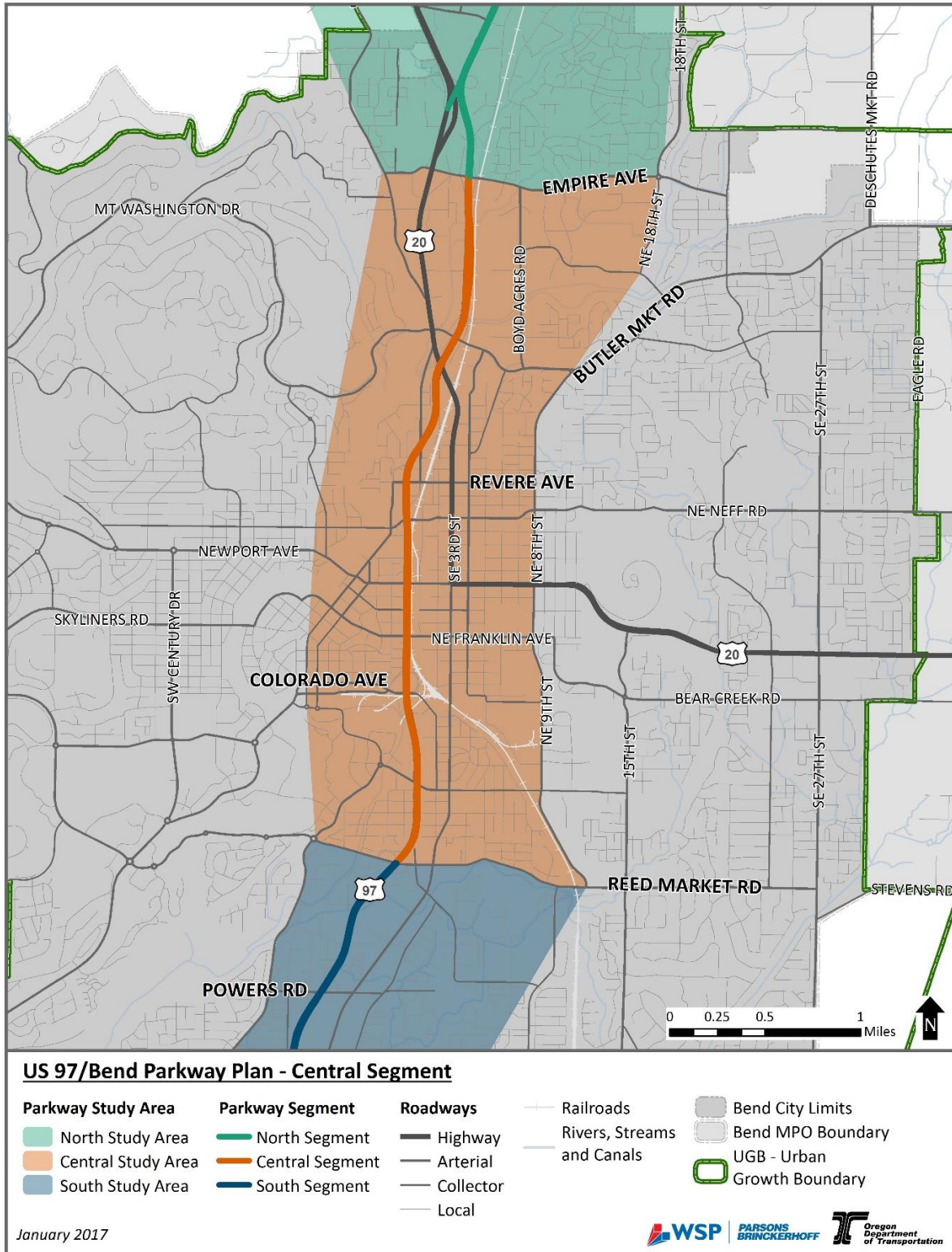
An IGA was agreed to between ODOT and the City of Bend to support the zone change for employment within a portion of URA-A. The zone change allows the city to rezone 256.2 acres of land from Urban Area Reserve (UAR) to Light Industrial (LI). This zone change will have significant effects on the planned and existing transportation facilities in the region. The agreement sets for a Vehicle Trip Limit for peak hour trips generated from the employment sub-district to 2,220 peak hour trips (between 4pm and 6pm). The city and ODOT developed a comprehensive mitigation strategy that includes land use measures, transportation demand measures and transportation improvements to local and state highway facilities to mitigate the significant effect of the zone change and avoid exceeding the Vehicle Trip Limit. With this IGA, the city and ODOT committed to the transportation improvements listed in Table 3-6 at a shared cost of \$53,360,000.

Table 3-6. Transportation Improvements to Achieve Vehicle Trip Limit

PM Peak Hour Trips	Mitigation Improvement	Total Cost	City Funded		ODOT Funded
			US 97	Local	
700	Empire Avenue/18 th Street Roundabout	\$4,000,000	\$0	\$4,000,000	\$0
	Empire/US 97 Northbound Ramp Terminal	\$1,600,000	\$1,600,000	\$0	\$0
	Empire/US 97 Southbound Ramp Terminal (Third Street to US 97)	\$3,600,000	\$3,600,000	\$0	\$0
600	US 97/Cooley Road Improvements	\$30,000,000	\$11,385,000	\$0	\$18,615,000
	US 97/Robal Road Improvements	\$1,500,000	\$492,600	\$0	\$1,007,400
	US 97 Raised Median – Nels Anderson Place	\$10,000	\$3,284	\$0	\$6,716
500	18 th Street Corridor Improvements Cooley to Empire – 3 lanes	\$4,400,000	\$0	\$4,400,000	\$0
340	US 97 SB auxiliary Lane – Empire Avenue to Butler Market Road	\$3,250,000	\$1,316,250	\$0	\$1,933,750
	Purcell Street Extension – Cooley to Yeoman	\$5,000,000	\$0	\$5,000,000	\$0

4 CENTRAL PARKWAY

The Central portion of the Parkway Plan study area is between Empire Avenue and Reed Market Road.



4.1 EMPIRE AVENUE EXTENSION, 2006

The City of Bend initiated the Empire Avenue Extension study to identify traffic operations, safety and other transportation system issues associated with extending Empire Avenue east between 18th Street and 27th Street. The study identified short-term improvement needs as well as longer term travel needs. The recommendations are as follows:

- Initial extension of Empire Avenue should be one lane in each direction, with left turn lanes at the intersections with Purcell Boulevard and Butler Market Road. The study found that the street would need to be widened to two travel lanes by 2021. Ultimately, the road should be consistent with the Major Arterial Street classification standards.
- Traffic signal and roundabout options are presented for Butler Market Road, Purcell Boulevard, and 18th Street intersections.
- There are three properties that will need local access to the Empire Avenue extension: Pine Nursery Park, Trinity Lutheran Church, and a city-owned property that will ultimately be a single-family housing subdivision.
- Empire Avenue must accommodate pedestrian and bicycle circulation with buffered sidewalks and on-street bicycle lanes, built to ADA standards. The extension should also accommodate access to and from the proposed multi-use trail to the pedestrian and bicycle facilities on Empire Avenue.

4.2 BEND CENTRAL WESTSIDE PLAN, 2016

In 2016, the City of Bend adopted the Bend Central Westside Plan (CWP). The objective of the CWP is to create a future land use and transportation vision for Bend's central west side in response to on-going development and transportation issues in the study area. The study area was bounded by Portland Avenue to the north, 19th Street and the Deschutes River to the east, the Deschutes River and West Ridge Avenue to the south, and a boundary roughly at NW Skyliner Summit Loop to the west. The study area for the Transportation network took a larger look at major corridors in the city. The study identified a preferred land use plan, transportation performance measures and a list of transportation projects and policies for the area.

The study revealed that there is need for enhanced east-west multi-modal connection under the Bend Parkway just south of the Colorado and Arizona couplet at Aune Street. This will provide an alternative route to 3rd Street and the Old Mill District. Next steps include the establishment of:

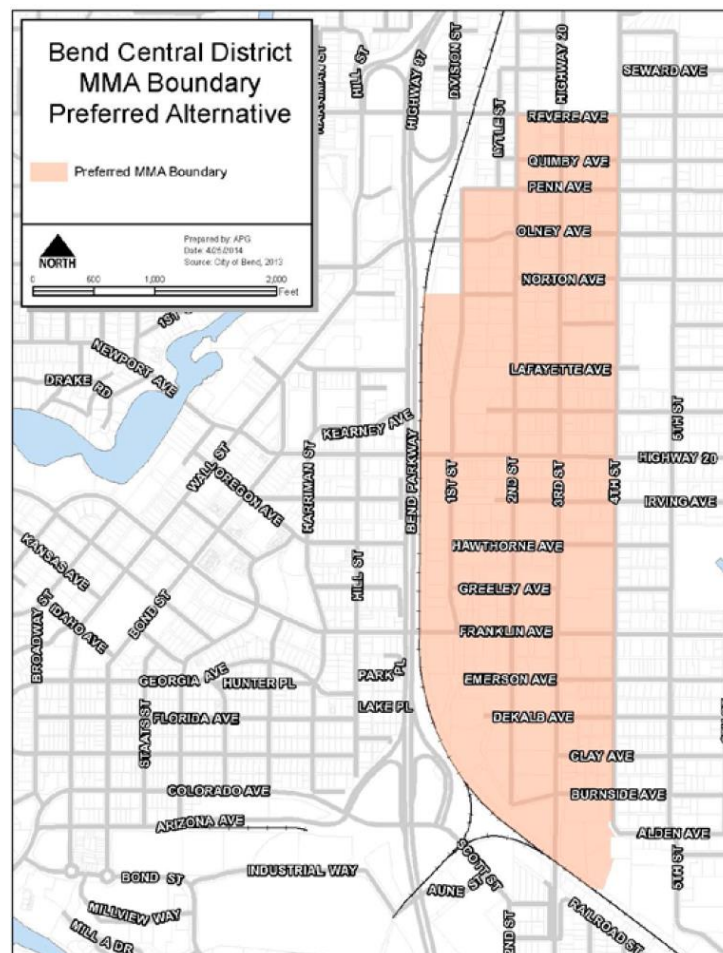
- policy and code language;
- transportation overlay district/area to fund and build the improvements;
- implementation of land use changes;
- conduct studies for Columbia/Street/Harmon Blvd., and Portland, Simpson, and Chandler avenues; and
- on-going community dialog.

4.3 BEND CENTRAL DISTRICT MULTIMODAL MIXED USE AREA PLAN, 2014

The City of Bend's Central District Multimodal Mixed-Use Area (MMA) Plan focuses specifically on an area between the Bend Parkway and 4th Street and between approximately Revere and Burnside

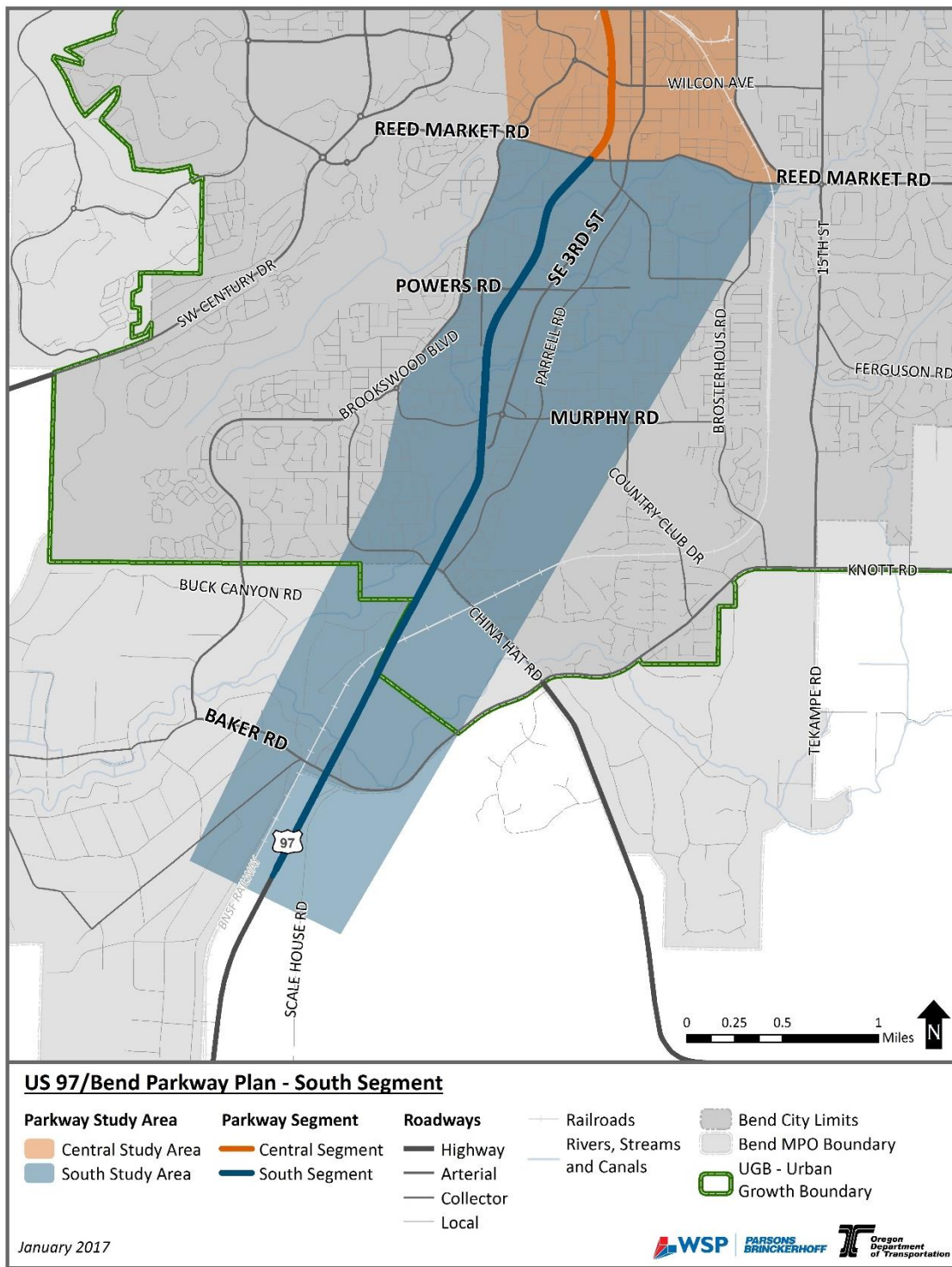
Avenues. The intent of the MMA designation is to help revitalize and facilitate future redevelopment in the area to create a vibrant district. The Central District MMA recommends:

- 1st street to be a combination of light industrial, residential, commercial uses with up to 6 or 8 story structures, allowing for significant redevelopment.
- 2nd Street provides for a mix of small-scale retail, office and residential uses. It will likely experience significant redevelopment of higher residential densities.
- 3rd Street is home to many larger scale commercial uses today and these will likely remain into the future. However, there may be a transition toward a mix of commercial, retail and residential in the southern portion close to downtown.
- 4th Street will be primarily residential with some mix of office and ground floor retail. Building height is limited to three stories to transition to lower density residential development to the east.
- East-west streets of Greenwood and Franklin will primarily be commercial or offices, other less used east-west streets will be a mix of residential and small-scale retail/commercial uses.
- The north-south streets and Greenwood and Franklin are major streets and will be enhanced with bicycle, pedestrian and transit connections.
- The plan calls for new or enhanced bike and pedestrian facility under crossings below US 97 particularly at Hawthorne Avenue and Franklin Avenue



5 SOUTH PARKWAY

The South portion of the Parkway Plan study area is between Reed Market Road and just south of Baker Road.



5.1 REED MARKET INTERSECTION EVALUATION, 2012

The City of Bend developed this plan to identify recommended lane configuration and intersection traffic control that would accommodate future year 2030 traffic demand along Reed Market Road between American Lane and 15th Street, east of the Parkway. The plan recommends the following:

- Construct traffic signals at the intersections of:
 - SE Reed Market Road/American Lane
 - SE Reed Market Road/SE 9th Street
- Realign American Lane where it crosses the Central Oregon Irrigation District canal approximately 250 feet west (consistent with the Reed Market Corridor Plan).
- Construct a multi-lane roundabout at SE Reed Market Road/SE 15th Street

Phasing options are identified for each of the recommended projects, if needed. Below is a list of other design considerations for these improvements that are relevant to this study.

- Design for emergency response vehicles should be incorporated at all intersections. All traffic signals should be equipped with emergency vehicle pre-emption and the roundabout should allow for an ambulance and a hook/ladder fire truck to stay in-lane for all approaches and exits.
- Sidewalk should be provided along both sides of SE Reed Market Road, American Lane, SE 9th Street, and SE 15th Street within the project limits. Sidewalks and curb ramps should be constructed per ADA requirements all on quadrants of all intersections.
- Bicyclists should be accommodated along all roadways and intersections to provide system connectivity.
- An advanced warning system which informs the public via message signs should be provided with advanced information about trains approaching the railroad crossing on SE Reed Market Road between American Lane and SE 9th Street. Advance warning devices could be located at SE Reed Market Road/SE 3rd Street and SE Reed Market Road/SE 15th Street.
- Communications infrastructure (conduit) should be provided between the railroad and adjacent traffic signals and train advanced warning system.
- The traffic signals at SE Reed Market Road/American Lane and SE Reed Market/SE 9th Street should feature heavy rail preemption.

5.2 SOUTH BEND PARKWAY REFINEMENT PLAN, 2004

ODOT in coordination with the City of Bend prepared the South Bend Parkway Refinement Study (SBPRS) in 2004. The SBPRS study area encompasses City of Bend and State of Oregon transportation facilities, located near the south city limits (SCL) of Bend, Oregon. The study area extends from just north of Powers Road to just south of the Baker Road interchange with U.S. 97 and extends from Brookwood Avenue on the west to Parrell Road on the east. U.S. 97 is the highest volume north-south highway in Central Oregon, and is designated an expressway as well as being the primary truck route. The purpose of the refinement study is to help develop a detailed improvement and management plan for this section of the Bend Parkway.

Twelve transportation options were developed to address the problems at the at-grade intersections on the Bend Parkway and south on U.S. 97. The 12 options and a no-build option were evaluated against

established performance requirements. The evaluation identified one recommended option that included the following elements:

- Construct a diamond-style interchange at Powers Road;
- Close the Badger Road connection to the Parkway;
- Restrict or close the Pinebrook Boulevard connection;
- Murphy Road realigned to the south and connected to Brookwood Boulevard;
- Romaine Village Way connection removed from U.S. 97;
- Ponderosa Avenue / China Hat Road intersection converted to right-in/right-out with acceleration lanes;
- Brookwood Blvd. widened to four lanes through the study area;
- Powers Road widened to four lanes between Brookwood Blvd and Third Street.
- A north-south frontage road west of the Bend Parkway connecting the Murphy Road extension to Romaine Village Way and Ponderosa Avenue. This roadway may also be extended to Baker Road in the future.
- A southbound connection from the Parkway to a frontage road, which connects the extension of Murphy Road with Romaine Village Way and Ponderosa Avenue.
- A northbound connection from Third Street to the Parkway via a loop ramp south of Murphy Road.

5.3 MURPHY CORRIDOR REFINEMENT PLAN, 2008

The City of Bend prepared the Murphy Corridor Refinement Plan identify key transportation issues and solutions along the Murphy Road corridor in southern Bend. The plan explored extending Murphy Road to the east to 15th Street or 27th Street as well as opportunities for multimodal design improvements along the existing segment of Murphy Road.

Figure 8. Murphy Crossing Study Area



The study made the following recommendations:

- Improve the existing section of Murphy Road within the existing right-of-way with a third lane, on-street bicycle lanes and sidewalks. Install either roundabouts or signal stop control intersections along the corridor at Parrell Road, County Club Road, and Brosterhous Road.
- Extend Murphy Road east to 15th Street with a bridge over the railroad tracks. The cross-section would be a width of 80-feet and include a center lane, a travel lane in each direction, bicycle lanes, planter strips and sidewalks on each side of the street.

5.4 MURPHY CROSSING URBAN RENEWAL PLAN, 2008

In 2008, the City of Bend adopted the Murphy Crossing Urban Renewal Plan (URP) to guide and facilitate development within the 230 acre urban renewal area (URA), shown on Figure 9. The area is in the vicinity of the southern convergence of the Bend Parkway and Southeast 3rd Street. The south westerly portion of the Area encompasses the Murphy Crossing Refinement Plan area and the north easterly portion includes part of the Southeast 3rd Street commercial corridor. The URP was developed to implement study decisions identified between 2001, with the initiation of the South Bend Parkway Refinement Study, through the 2008 Murphy Corridor Refinement Plan.

URA transportation projects were listed in priority order to include:

1. Local Streets West of Bend Parkway: The local streets west of the Bend Parkway include Murphy Road from the overpass (see project 2 below) west to the Brookwood Road roundabout and a new street from the central roundabout north to Murphy Road.
2. Murphy Overcrossing of Parkway: This includes an overpass on Murphy Road and a realignment of Murphy Road east of Parkway and a new street from Ponderosa Road north to the central roundabout.
3. Frontage Road(s): This improvement includes construction of Frontage Road from Murphy Road north to Pinebrook Road and from Pinebrook Road north to Badger Road.
4. Parkway Improvements: Parkway improvements include a 3rd Street flyover ramp (a ramp which goes over the top of the Parkway), a southbound off ramp and a northbound on ramp
5. 3rd Street Corridor Improvements:
 - a. 3rd Street improvements from Pinebrook Road to Powers Road consist of streetscape improvements including sidewalks, landscaping, parking bays, median treatments and street lighting.
 - b. Intersection improvements at 3rd Street and Powers Road and streetscape improvements including street lighting, sidewalks, bike lanes, landscape strips.
 - c. Intersection improvements at Powers/Parrell/Chase roads and improvements to the street connections to city standards from Chase Road to Brosterhous Road.
 - d. Improvements to Parrell Road from Chase Road to Murray Road to modernize Parrell Road and meet city standards.
6. Murphy Road Overcrossing: The Murphy Road overcrossing from Brosterhous Road to 15th Street consists of constructing a three lane bridge over the Burlington Northern Santa Fe Railroad tracks including a roundabout intersection improvement at Brosterhous Road and 15th Street.

Figure 9. Murphy Crossing Urban Renewal Area

